

**Czech University of Life Sciences Prague**

**Faculty of Economics and Management**

**Department of Economics**



**Master's Thesis**

**The Impact of Occupational Safety and Health Systems on  
Employee Performance in Ghana: The Case Study of the  
B5 Plus Steel Manufacturing Company**

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## DIPLOMA THESIS ASSIGNMENT

BSc. Caroline Naateki Nartey

Economics and Management

Thesis title

**The Impact Of Occupational Safety And Health Systems On Employee Performance In Ghana: The Case Study Of The B5 Plus Steel Manufacturing Company.**

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### Objectives of thesis

1. To determine the causes of accidents and risks in the working environment of the B5 Plus Steel Manufacturing Company.
2. To identify the various occupational safety and health systems in the B5 Plus Steel Manufacturing Company.
3. To assess the effect of occupational safety and health on the productivity of workers in the B5 Plus Steel Manufacturing Company.

### Methodology

The study uses the mixed method which utilizes questionnaires and interviews administered to respondents.

The target population for the study are workers at the B5 Plus Steel Manufacturing Company in Accra, Ghana. This specific factory was selected because it is the biggest steel manufacturing company in Ghana, which has won several accolades for its performance, and it represents an ideal and easily accessible manufacturing industry setting.

Both convenience and purposive sampling techniques will be used to select the respondents (299 employees) for the questionnaire as well as those for the interview (5 members of Top Management from Finance, HR, Supervision, Safety Department etc). Sample was selected out of 1342 employees using a 95% and a 5% margin of error.

This study will make use of both primary and secondary sources of data. Management reports on investments into Occupational Health and Safety (OHS), annual records of reported workplace illnesses, injuries and accidents, and records of annual production outputs and registers with hours worked will be used to analyse how investments into OHS management systems impact the incidence of accidents, diseases and injuries and how both variables influence productivity (outputs/inputs per year). It is anticipated that the more investments in Occupational Health and Safety Management Systems (OHSMS), the lesser the accidents, diseases and injuries reported and the higher the outputs of the B5 Plus Factory (and the reverse). Data from the questionnaires will be used to examine the hazards and risks in the B5 Plus Steel Manufacturing Company, while assessing self-reports on how work-related health problems (physical or mental)

affected absenteeism, presenteeism and motivation (which are key indicators of performance) among the workers.

The study will employ the regression analysis to determine the effect of the independent variable (occupational health and safety management systems) on the dependent variable (employee productivity).



## The proposed extent of the thesis

60 – 90 pages

## Keywords

Occupational Health and Safety, Employee Performance, Accidents, Risks, Productivity

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## **Declaration**

I declare that I have worked on my master's thesis titled "The Impact of Occupational Safety and Health Systems on Employee Performance in Ghana: The Case Study of the B5 Plus Steel Manufacturing Company" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the master's thesis, I declare that the thesis does not break any copyrights.

In Prague on 31.03.2023

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**CAROLINE NAATEKI NARTEY**

## **Acknowledgement**

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# **The Impact of Occupational Safety and Health Systems on Employee Performance in Ghana: The Case Study of the B5 Plus Steel Manufacturing Company**

## **Abstract**

This study assesses the influence of Occupational Health and Safety Management Systems on employee performance in the B5 Plus Steel manufacturing company, the leading steel manufacturer in Ghana. In the practical part, through a mixed method approach, interviews with five managers were analysed with questionnaire responses from 299 workers. The study discovered that ergonomic hazards constitute the main causes of accidents and risks at the company. To deal with all hazards in the workplace, the company has set up some occupational health and safety management systems. Through regression analysis, a positive significant relationship was found between most of the occupational health and safety management systems and employee performance and productivity and also between investment in health and safety systems and production output. The study further concludes that when occupational health and safety management systems are not available or not functional, they lead to productivity loss due to absences and reduced effort from workers resulting from ill-health. The study recommends that B5 Plus company and similar organizations should improve investments in and compliance to health and safety management systems in order to improve employee wellbeing and performance.

**Keywords:** Occupational health and safety, employee performance, accidents, risks, productivity

# **Vliv systémů bezpečnosti a ochrany zdraví při práci na výkon zaměstnanců v Ghaně: Případová studie společnosti B5 Plus Steel Manufacturing Company**

## **Abstrakt**

Tato studie hodnotí vliv systémů řízení bezpečnosti a ochrany zdraví při práci na výkonnost zaměstnanců ve výrobní společnosti B5 Plus Steel, předním výrobcí oceli v Ghaně. V praktické části byly prostřednictvím smíšené metody analyzovány rozhovory s pěti manažery s odpověďmi na dotazník od 299 pracovníků. Studie zjistila, že ergonomická nebezpečí představují hlavní příčiny nehod a rizik ve společnosti. Aby bylo možné řešit všechna rizika na pracovišti, společnost zavedla některé systémy řízení bezpečnosti a ochrany zdraví při práci. Prostřednictvím regresní analýzy byl nalezen pozitivní významný vztah mezi většinou systémů řízení bezpečnosti a ochrany zdraví při práci a výkonností a produktivitou zaměstnanců a také mezi investicemi do systémů bezpečnosti a ochrany zdraví při práci a výrobním výstupem. Studie dále dochází k závěru, že pokud systémy řízení bezpečnosti a ochrany zdraví při práci nejsou k dispozici nebo nejsou funkční, vedou ke ztrátě produktivity v důsledku absencí a sníženého úsilí pracovníků v důsledku špatného zdravotního stavu. Studie doporučuje, aby společnost B5 Plus a podobné organizace zlepšily investice do systémů řízení bezpečnosti a ochrany zdraví při práci a jejich dodržování, aby zlepšily pohodu a výkonnost zaměstnanců.

**Klíčová slova:** Bezpečnost a ochrana zdraví při práci, výkonnost zaměstnanců, úrazy, rizika, produktivita

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## **1. Introduction**

Occupational Health and Safety (OHS) management is a crucial aspect of organizations that aim to create safe and healthy environments for workers. Organisations setup OHS management systems to eliminate hazards and risks that cause accidents and illnesses.

The importance of OHS in enhancing employee performance and productivity cannot be overlooked. Having a sick and injured workforce invariably leads to absenteeism, reduced performance and productivity, and increased healthcare costs for businesses. Therefore, several companies are beginning to invest in OHS so that workers can be healthy physically, psychologically, and socially enough to improve overall performance and productivity.

While hazards exist in all workplaces, research globally suggests that the steel manufacturing industry is extremely an unsafe working environment. Workers at steel plants face a great risk of accidents, health concerns and even death while working. They are often vulnerable to fires and explosions, extreme heat, toxic substances, stress and other risky working conditions.

In Ghana, the steel manufacturing is a driver of industrialization and development. It provides employment and its products are indispensable for infrastructure and other manufacturing activities. The industry is not only a supplier for domestic demand but also for exports. Considering the important economic contributions to the industry, it is important for its human assets to be kept safe and healthy so they can contribute to the goals of the organization. It is expected that OHS systems will be in place to protect not just workers but also managers, consumers and visitors.

What is observed however is the frequent accidents at steel plants. In general, the quality of OHS of various steel companies have not been documented nor has the impact of OHS management systems, especially in terms of reduced absences and performance, been critically examined.

In Ghana, the B5 Plus Steel Manufacturing company stands out as the leading steel manufacturer. The company therefore serves as an interesting case to understand the OHS situation in a steel company and how OHS management systems influences employee performance and productivity.

Overall, this thesis, through its case study, seeks to provide valuable insights into the importance of OHS management in enhancing employee performance and productivity, and the need for organizations to prioritize OHS management as part of their overall business strategy.

## **2. Objectives and Methodology**

### **2.1. Research Objectives**

The core objective of this study is to assess the effect of occupational safety and health management systems on employee performance in the metal manufacturing industry using a case study of the B5 Plus Steel Manufacturing Company in Ghana.

The specific objectives of this case study will be:

1. To determine the causes of accidents and risks in the working environment of the B5 Plus Steel Manufacturing Company
2. To identify the various occupational safety and health systems at B5 Plus Steel Manufacturing Company.
3. To assess the effect of occupational safety and health on the productivity of workers of the B5 Plus Steel Manufacturing Company.

### **2.2. Research Questions**

To guide the study, the following research questions have been formulated:

1. What are the causes of accidents and risks in the working environment of the B5 Plus Steel Manufacturing Company?
2. What are the various occupational safety and health management systems in the B5 Plus Steel Manufacturing Company?
3. To what extent does occupational safety and health influence the productivity of workers at the B5 Plus Steel Manufacturing Company?

### **2.3. Research Methodology**

This section comprises considerations on the research design, target population, sampling, data collection and analysis for the study.

#### **2.3.1. Research Design**

The study will adopt the descriptive research design. In descriptive research, a researcher seeks to collect, organize and analyze data that can describe a phenomenon (Glass & Hopkins,

1984) and help in evaluating it (Engelhart, 1972). This specific design is suitable for this study as it allows appropriate because, as Gay (2003) notes, it is used to investigate the behaviours and perceptions that are held about a phenomenon under study. Kothari (2004) adds that the purpose in the descriptive survey design is to record, analyzing and report conditions in order to describe phenomena, past or present.

The study will employ a mixed methodology. The mixed methods approach relies on both quantitative or numerical and qualitative data to provide more valid and dependable understanding of a phenomenon under study (Cresswell, 2014). Interview guides and questionnaires were the main tools for obtaining data on the degree to occupational safety and health influences performance of employees. These questions on the interview guide and questionnaires for data collection were reviewed by experts and validated. The aim of the interviews was to employ an embedded design in which data collected from members of the management interviewed can be used to supplement conclusions from the quantitative data. This will provide managements' view of the organisation's support and investment in OSH management as well as the importance and effect of OHS management systems.

The interviews will be run concurrently with the survey. A questionnaire comprising items that assessed demographic characteristics, the presence of OHS management systems, and as well as the impact of work-related ill health on self-reported absenteeism, presenteeism, and job satisfaction and commitment. Besides that, her questionnaire was constructed with questions adapted from the IWH Workplace and Safety survey Questionnaire and the World Health Organization's Health and Performance Questionnaire.

### **2.3.2. Target Population**

The target population for the study will comprise workers of the B5 Plus Steel Manufacturing Company in Tema in the Greater Accra Region of Ghana. The company employs about 1000 workers directly or indirectly. This specific factory was selected because it is the biggest steel production company in Ghana, which has won several accolades for its performance. The company represents an ideal and easily accessible manufacturing industry setting and it boasts a large number of workers who work on permanent full time, permanent part-time or on a contractual basis.

### **2.3.3. Sampling**

For this study, both convenience and purposive sampling techniques will be used to select 299 employees as respondents for the questionnaire. Sample was selected out of 1342 using a 95% and a 5% margin of error. The sample is determined to be representative of the overall population considered for this study. 5 members of Top Management, specifically the heads of the Production, Safety, Finance, HR and Supervision Departments) were also purposively selected and interviewed.

### **2.3.4. Data Collection: Sources and Instruments**

This study employs both primary and secondary sources of data. Management reports on investments into OHS, annual records of reported workplace illnesses, injuries and accidents, and records of annual production outputs (metric tonnes of steel produced) and registers with hours worked will be used as secondary sources of data to analyse how investments into OHS management systems impact the incidence of accidents, diseases and injuries and how both variables influence productivity.

Productivity as a measure was simply estimated using the outputs of a company (unit of steel produced). The data on OHS investment and production figures over a ten-year period (2012-2022) was analysed to investigate the relationship between investments in OHSMS and productivity of the B5 Plus Factory over the years.

Primary data was obtained through interviews and the use of semi-structured questionnaires that were given to the employees. The interviews will be conducted with 5 members of management to ascertain Management perceptions, support and investment in OHS management systems. Data from the interviews will be supplement with questionnaire responses to answer the research questions of this study.

The questionnaire for this research was developed based on the objectives of the study by comprising four sections. The preliminary section (Section A) covered the demographic information about each respondent. Section B asked questions about the kinds of health and safety hazards workers at the company might be exposed to in their jobs. This was to fulfil the first research objective which aimed at discovering the causes of accidents and risks in the working environment of the B5 Plus steel manufacturing company. Section C explored the kinds of measures, policies and procedures (OHS management systems) in place to make the workplace

safe. This section sought to meet research objective 2 which sought to ascertain the various occupational safety and health management systems in the B5 Plus which in turn is a sign of management's support for occupational health and safety. Section D sought to assess views of workers on management's support for occupational health and safety aimed at providing answers to fulfil the third objective of this research that was to gauge the extent to which occupational safety and health influences the productivity of workers at B5 Plus. This enquiry sought to test the impact of OHS management systems on satisfaction, absenteeism and presenteeism which have been identified in the literature as key indicators of job performance and productivity.

Thus, Section D of the questionnaire explored the satisfaction/non-satisfaction of workers with existing OHS management systems (measures, policies and procedures) at the company's working areas and investigates how the satisfaction or non-satisfaction affects job performance. It also looked into the incidence of accidents, injuries and diseases caused or worsened by work while investigating how these incidence impact attendance and output at work (namely, absenteeism and presenteeism).

Among other more specific questions based on their specific roles, each member of Management will be asked questions on their assessment of OHS management systems at B5 Plus while exploring opinions on how management's view of the importance of OHS to workers and lastly, their views on the impact of OHS on employee performance and productivity.

One main limitation with this chosen methodology is that the study will partly rely records provided by the company which may not readily available or accurate. Again, relying on the self-reports from questionnaires from workers may leave the study prone to their personal biases (Primi et al., 2016). This is because self-report-based instruments are prone to acquiescence. Acquiescence refers to the tendency of respondents to choose positive categories on a Likert scale regardless of the actual content of the items despite the item content.

### **2.3.5. Validity and Reliability**

The items in both the interview and the interview guide were scrutinized for validity and reliability. They were checked by the supervisor of the research and other subject-matter experts for its internal consistency and effectiveness in acquiring the needed information with minimal biases. Through a pilot study, the tools were taken through the test-retest method to ensure reliability. A month to the data collection in the study area, the pilot study was conducted at another factory in

Tema which has a similar profile as the B5 Plus. The researcher administered the questionnaire to 15 respondents outside the study area and after two weeks, repeated the action with the same participants. The data collection tools proved able to consistently measure the same variables.

#### **2.4. Data Collection Procedure**

To begin collection of data, a letter of introduction that seeks permission and explains the intended purpose of the study was sent to the Company. Upon being granted permission, letters of notice were sent to various heads of department to inform them of the research.

Appropriate permission and arrangements were made during which respondents for the interview gave consent and scheduled times for the interviews. The interviews were conducted after normal work hours through calls on Zoom when convenient for the respondent. This was to ensure that working hours were not interrupted and allowed the researcher to get more cooperation from them. Each interview session was recorded while the researcher took preliminary notes of key observations of themes that could make analysis easier and meaningful. In a concurrent period, the questionnaires were administered. Each participant was assured of utmost confidentiality. From preliminary checks, it was realized that several workers may not comprehend the questionnaire or even be able to fill them adequately due to their low educational background. Thus, representatives from each department were made to explain how to assess the Google Form online as well as to explain the various aspects of the questionnaire in Twi, the common local language in Ghana.

#### **2.5. Data Analysis**

The questionnaires were designed using Google Form and were hosted online. Links were shared on company WhatsApp platforms. This made it possible to achieve a 100% response rate as all 299 required and sampled respondents were able to fill the forms. This ensured that the data collected had the needed completeness and internal consistency. Data collected was coded and analysed using the Statistical Package for Social Sciences (SPSS). The purpose of the analysis was to examine the hazards and risks in the steel manufacturing company, while assessing self-reports on how work-related health problems (physical or mental) affected absenteeism, presenteeism and motivation (which are key indicators of performance) among the workers. The study employed regression analysis to determine the effect of the independent variable (occupational health and safety management systems) on the dependent variable (employee productivity). The study will

also go further to calculate how much productivity is lost due to specifically absenteeism and presenteeism.

To arrive at the productivity loss due to absenteeism, a simplified reiteration of the lost wages method similar to that used by Mitchell and Bates (2011) was employed. The lost wage method uses lost time and wages to calculate money lost by employers when workers miss hours or days for paid work. Workers were asked to indicate any hours missed in the past month because of a work-related health problem. Having done that, a percentage value was obtained by dividing the cumulative hours missed from work due to work-related health problems in the past month as reported by respondents by the total expected hours for the month. The following formula will be used:

$$\frac{\text{reported hours missed due to absenteeism}}{\text{total hours expected (24 working days)} \times 299} \times 100\%$$

This percentage arrived at will then be multiplied by the total monthly wage for 299 workers to obtain a monetary estimation of how much lost time or absenteeism costs the steel company, B5 Plus. The formula will be:

$$(\% \text{ of hours missed} \times (\text{average monthly wage} \times 299))$$

Productivity loss associated with presenteeism will be calculated by asking respondent to indicate any reduced performance due to being at work while carrying a health problem caused or made worse by your unsafe conditions at the workplace. Rating 0 (zero) will mean “no performance at all. Rating 1-9 will mean a reduction while rating 10 will mean no reduction in performance.

Using the mean (average reported mark), a percentage rate of the changes or reduction in performance due to work-related ill-health will be calculated using the difference between the mean and 10 (usual performance). The formula below will thus be used:

$$\frac{10 - \text{mean rating}}{10} \times 100\%$$

After that, the lost wages method will be used. The percentage of performance lost in the past month WILL BE multiplied with the average monthly wage due all respondents as in the formula below:

$$\% \text{ of reported lost performance} \times (\text{average monthly wage} \times 299)$$

In both cases, the amount lost due to absenteeism and presenteeism will be extrapolated to a year to arrive at estimated annual losses in cedis

Interviews were also conducted with the Production, Safety, Finance, Human Resource, and Supervision Management heads. Each interview session was recorded, transcribed and assigned codes for analysis. The study uses an embedded design to analyze the data. In this design, one set of data is the primary data set which will be enhanced by the secondary data set. In this study, the quantitative data collected through questionnaires is the primary data set while the qualitative data gathered through interviews is the secondary data. Together, qualitative data from the interviews will be used to supplement the quantitative data from the questionnaires in order to answer the three research questions of the study.



### **3. Literature Review**

#### **3.1. Introduction**

This chapter undertakes a review of the available literature on Occupational safety and health. The conceptual review provides an understanding of key concepts related to OSH and OSH management systems, as well as the general workplace risks and hazards and those specifically related to the steel manufacturing industry. The chapter examines literature on the state of OHS management in Ghana. Empirical studies were also reviewed to examine existing knowledge on the influence of OHS activities on productivity.

#### **3.2. Overview of OSH Management**

Faller, bin Miskam and Pereira (2018) define Occupational Safety and Health or Occupational Health and Safety (OHS) as a multidisciplinary concept that involves preventing hazards and ensuring all aspects of the worker's health and safety while in the working environment. It is a management principle seeks to preserve the physical, psychological and social well-being by eliminating the rising and undesirable rate of accidents and injuries (Chaturvedi, 2007).

The International Labour Organization indicates that about 250 million workplace accidents and 160 million work-related diseases occur each year, leading to an estimated annual figure of 2.3 million deaths per year. As Dr. Jukka Takala, Head of the ILO's Health and Safety programme reveals, annual average statistics show that workplace injuries and diseases cause more deaths than are caused by road accidents, war, violence and HIV/AIDS (ILO, 2019). Generally, occupational injuries and diseases place a toll on the victim and his or her family while also affecting the employer. Per Asumeng et al. (2015), they affect the lives, reduce productivity, tarnish the image of organizations and can cause problems in recruitment and turn-over rates. These effects have brought growing attention to the need to improve occupational health and safety all over the world and led to the designing of occupational health and safety systems.

Nielsen (2000) accepts that the concept of OHS systems is not well-defined in management studies and thus, it is referred to, in theory and practice, by different variations which still point to activities of occupational health and safety. This is why in the literature on OHS, the terms, "OHS activities", "OHS management systems" and "OHSM systems" seem to be used interchangeably. What

dominates in the literature however is the term “occupational health and safety management systems” (OHSMS).

Occupational Health and Safety Assessment Series (OHSAS) 18001 (2007) states that OHSMS are the part of a management system used to design and execute its OHS policy and manage risks. OHSMSs are instruments that enable organizations and their managers to deal with OHS issues and risks (Granerud, 2011). They provide standardized ways of making workplaces safe and workers healthy. Per Bwengye (2021:15), “a formalized OHS management system is a collection of rules and related components of the general organizational management system that ensures that the industry’s goals are accomplished to enhance the protection of both workers and the environment”. Górný (2019) adds that an effective occupational health and safety (OHS) management system basically involves the identification of hazards and the creation of controls for risks. According to WorkSafe BC (2022) in an effective OHS management system, the organization managers set agenda, establish policy and objectives, while also making available all the needed resources for OHS activities. Kaynak et al. (2016) also indicate that occupational health and safety management practices as comprising safety measures, risk management, safety and health directives, support and training for first aid, accident prevention, and organizational support for safety.

OHS systems also include safe work procedures and written instructions created based on examinations of workplaces, equipment, work practices and reported accidents to identify various risks and hazards (WorkSafe BC, 2022; Górný, 2019; Li & Guldenmundb, 2018). In some organizations, persons, internally or outsourced, form committees that seek to bring up and manage matters related to the health and safety of workers. The system undergoes regular audits to make adjustments and improvements to the system (Li and Guldenmundb, 2018).

Organizations have a responsibility to create workable systems to ensure OHS but that should not be done without the perspective and inputs of workers themselves (Eakin et al., 2010). One can also rely on certified international standards and guidelines such as the ILO-OSH (2001), BS 8800 (2004), OHSAS 18001 (2007) and the latest addition, the ISO 45001. The ISO 45001 replaces the OHSAS 18001 as a more sustainable international framework for Occupational Health and Safety (OHS) management systems (ISO 45001, 2018).

### **3.2.1. Workplace Risks and Hazards**

Workers are vulnerable in the face of hazardous substances and equipment they come into contact with in the workplace. Every workplace has hazards.

Generally, a hazard is anything that could potentially harm or adversely affect the health of something or someone (World Health Organization, 2002). Work-related hazard on the other hand is a potential threat that is related to one's work or employment. Schulte et al. (2012) define workplace hazard as a short-term and long-term threat resulting from an unsafe and unhealthy workplace. Bello (2010) suggests that it could be a situation, process, material or substance in a workplace that has the potential to cause accidents or disease.

In ancient times, accidents were seen as inevitable occurrences or were part of one's fate as determined by a diety (Boahene, 2015). While natural occurrences can cause accidents, Kalejaiye (2013) indicates that workplace accidents are brought about mainly by unsafe conditions at the workplace and also unsafe acts by people.

Increasingly, research on occupational Health and Safety has brought focus to the causes of workplace accidents and the need to prevent them. Employers, labour unions and governments are becoming more concerned about the health of employees due to its impact on worker absenteeism, turn-over rate and productivity. Per the International Labour Organization (ILO), about 264 million nonfatal accidents occur each year resulting in work-related illnesses (ILO, 2015), These ailments in turn lead to about 3 days of absence from work (Amponsah-Tawiah & Mensah, 2016). Another report by ILO states that 2.78 million workers die from occupational accidents every year (Amponsah-Tawiah Mensah, 2016). The International Labor organization estimates that 4% of the global GDP is lost economically due to industrial injuries and illnesses.

According to Tadesse (2006), hazards in a working environment arise out of three main interactions. That is man engaging with (1) physical, biological and chemical entities (2) with machine and with (3) his psychosocial environment. Each of these interactions leads to threats and dangers that a worker can experience. These hazards are classified into physical, biological, chemical, ergonomic and psychosocial.

Physical hazards are those hazards that cause bodily harm. Tadesse (2006) reveals that, in developed and industrialized countries, up to 30% of workers experience physical hazards. In

developing countries as in Africa, this number rises up to about 80% of the overall workforce. Related to this type of physical hazards are mechanical hazards that could include malfunctioning machinery, unshielded equipment, unsafe tools.

In workplaces, where workers have to relate with other humans and even animals as in the health and veterinary sciences, biological hazards might be prevalent. Health workers for example are at risk due to exposure to blood and body fluids (Türe et al., 2016; Hebo et al. 2019), infections like Tuberculosis and Hepatitis B (He et al., 2017; Konlan, Aarah-bapuah, Kombat & Wuffele, 2017), and injuries from needlesticks and other sharp objects (Matsubara et al., 2017).

Chemical hazards refer to harmful chemicals, gases and other substances that can endanger the safety and wellbeing of people (Tadesse, 2006; Jain & Dheenathayalan, 2018).

Ergonomic hazards are those hazards that are related to work design, the physical structuring of the workplace among others. In the words of Tadesse (2006, p. 86):

*Between 10% and 30% of the workforce in industrial countries and between 50% and 70% in developing countries may be exposed to heavy physical workload or to unergonomic working conditions such as lifting and moving of heavy items or repetitive manual tasks.*

Psychosocial hazards describe hazards that affect the psychological and emotional well-being of workers while also impacting the social relationships they engage in. Psychosocial factors in the working environment include nature and pace of work, organizational climate among others (Tadesse, 2006).

In some professions, digital hazards may also exist which include online threats such as cyber-attacks, hate speech, bullying and trolling (Jamil, 2017).

### **3.2.2. Risks and Hazards in the Steel Manufacturing Industry**

While every workplace has hazards, the metal manufacturing industry has been identified as one of the most unsafe working environments, replete with many hazards (WSA, 2020). In order to come out with various steel products, workers at steel plants undertake processes such as “scarfing, pickling, annealing, hot and cold rolling, extrusion, galvanizing, surface coating, cutting and slitting, and other operations” (ILO, 2005: 5). Each of these processes may cause workers to come into contact to certain hazards that may lead to an accident, injury, illness or even death.

These hazards affect manual workers, supervisors and visitors to the manufacturing plants. Hazards in a typical steel manufacturing industry are generally classified as physical, chemical, respiratory, mechanical, ergonomic and psychosocial hazards (Bwengye, 2021).

### **A. Physical Hazards**

Per Safe Work Australia (2013) as well as Jain and Dheenathayalan (2018), workers at steel manufacturing factories are at risk due to physical hazards. Accidents can occur due to these hazards during any of the procedures for the steel product preparation such as cutting, casting, grinding, and welding. Such injuries could cause loss of body parts, permanent disability or even death (Bharwana et al., 2019).

#### *Electrocution, Burns, Fires and Explosions*

Workers may be victims of electrocution, fires, explosions or burns due to liquid metal and hot slag spillage (Jain & Dheenathayalan, 2018; Bwengye, 2021). Power sources for electric furnaces and other appliances present a serious hazard for steel workers. Fires and explosions also are common occurrences around furnaces at steel plants. They usually occur when molten metal gets into contact with water. As ILO (2005) notes, the water may be from metal scraps, moulds and leaks from the buildings or from the cooling system of the furnace itself. Furnaces that use gas or oil as a fuel may also cause fires and explosions when these fuels ignite. Several explosions have for example been recorded in Ghana over the years. In 2012, an explosion reportedly due to an overloaded furnace left 11 workers, who at the time of the accident were reportedly without any personal protective equipment, injured at Special Steel Ltd, an Indian-owned steel manufacturing company in Tema, Ghana (Daily Guide Africa, 2012). In 2016, another explosion from a steel smelting equipment splashed hot liquid metal, severely injuring seven workers and leaving one dead (Ghana Star, 2016).

#### *Heat*

Workers in steel factories are vulnerable to extreme and unhealthy heat levels (ILO, 2005; Bwengye, 2021). Furnaces and foundries at steel manufacturing plants are mostly very hot working areas where breathing and working in general can be very comfortable. In most cases, it is ideal to reduce the need for protective clothing which add more heat by reducing contact with other hazards. One could also reduce the pace of work or restructuring work with rest periods and shifts

so that workers can pace themselves and not be additionally stressed by both the work and the heat.

### *Confined Spaces*

In the iron and steel industry, confined spaces are common. . Confined spaces like in furnaces and foundries are particularly related to a number of hazards which include more vulnerability to harmful gases and vapours, high likelihood of fires, poor ventilation and heat stress. Several foundries, for example, hold toxic air-borne substances in concentrations above the permissible exposure levels and thus, exposing usually furnace operators and maintenance workers. This is especially so if no other controls exist in the workplace or those which exist are inadequate (ILO, 2005).

### *Cuts and Trappings*

Per ILO (2005), steel products may be obtained from factory production leftovers and scraps like factory offcuts, materials gotten from slag, ashes and dross from foundries. Handling of metal scraps and metal products in general can pose danger to steel factory workers. As steel products are being sheared, cropped or trimmed, accidents may occur. Workers in rolling mills, may be trapped by rolls Scales from mills may fly about causing injuries to eyes and other parts of the body. Sharp edges of sheets or strips of steel may cut and injure workers.

### *Transport related accidents and Falling objects*

According to ILO (2005), without appropriate personal protective equipment (PPEs) like hard hats, workers may sustain injuries from falling objects from cranes, hooks among others. Hazards related to transport also are prevalent in most steel factories (WSA, 2020). Vehicles are used to transport raw materials for as well as products, by-products and waste from steel production processes using road or rail networks. Accidents can occur during this transportation as when vehicles can crash or collide with people, buildings and other vehicles or when loading items fall from vehicles. Other dangerous accidents may occur due to being crushed by moving excavators, forklifts, falling objects or other machinery.

### *Noise*

Another hazard most commonly noted is the high levels of noise produced mainly by machinery at steel plants. Bharwana et al. (2019) states that noise is one of the most obvious hazards in metal manufacturing industries. High noise levels, which are inimical to one's hearing and could cause deafness, are produced by machines in the course of cutting, grinding and welding materials.

### *Falls/Slips and Trips*

Workers may slip, trip or fall due to equipment laying on the floor, slippery floors among others. Workers who have to climb heights at steel plants risk falling without safety equipment like harnesses and lifelines attached to anchor points (ILO, 2005).

## **B. Chemical Hazards**

Again, during steel manufacturing activities, workers come into contact with certain chemical hazards in the form of gases and liquids. ILO (2005) notes that coke-making is another dangerous process during steel-making. Coke is produced with either petroleum or coal in blast furnaces. Even, in electric arc furnaces which are more popular now, the addition of chemicals to scraps or other iron-containing materials in the steel making process is very risky (AlAsfar and Salim, 2011; Backman, Kyllönen and Helaakoski, 2019). The steel-making process is associated with unhealthy exposure to dusts from coal, chemicals and gases like benzene, ammonia and hydrogen sulphide. For example, aromatic hydrocarbons released from coke-making have been known to be potential triggers of cancers and biological mutations (ILO, 2005; Cottica et al., 2018). Workers also can be asphyxiated due to the release of gases such as nitrogen, argon and blast furnace (BF) gas (Jain & Dheenathayalan, 2018).

## **C. Ergonomic Hazards**

On ergonomic hazards, Tendai and Jerie (2017) indicates that steel-making in general requires "heavy duty work" that predisposes employees to "ergonomic hazards such as repetitive and forceful movements, vibration, temperature extremes, manual handling and awkward postures" (p. 51). In most steel factories, many workers report developing musculoskeletal disorders esp. back pain and other injuries which are due to such ergonomic hazards as manual handling of large objects, assuming uncomfortable work postures, confined spaces, uncomfortable chairs., confined

spaces, long hours of working in same position, awkward bending or twisting (ILO, 2005; Tendai & Jerie, 2017).

#### **D. Psychosocial Hazards**

Psychosocial threats to workers generally involve psychological or emotional responses to interactions with one's job and people in the workplace. These psychological hazards include unfavourable workload or poor work schedule and workplace violence which can be physical, verbal or sexual (Kamchuchat et al., 2008; Mensah and Amponsah-Tawiah, 2016; Bwengye, 2021). According to Hacer and Ali (2020), victims of workplace violence often experience high levels of emotional stress, low esteem and burnout. Again, burn-out in the workplace has been attributed to a dissatisfactory co-relation between the effort workers put in and the rewards they get for it (Colindres et al., 2018).

#### **3.2.3. The State of Occupation Health and Safety in Ghana**

In Ghana, workplace issues are under the control of the Ministry of Employment and Labour Relations. Among its many responsibilities, the ministry is tasked to “ensure safe and healthy working environments in selected segments of formal and informal sectors by integrating OSH in its key functions” (ILO, 2017). Ideally, various employers and the Government are committed to the health of human resources. Ghana's 1992 Constitution affirms this when it states in Section 24(1) that “every person has the right to work under safe and healthy conditions”. This legal provision is also re-affirmed by the Labour Act, 2003 (Act 651). According to the Komfo Anokye Teaching Hospital (KATH, 2019) policy document, the duties of the employer based on the Labour Act are the:

1. Creation of safe systems of work
2. Provision of a work environment without risks to health and safety
3. Reduction of the incidence of accidents and injuries through the training of employees
4. Supply and maintenance of safety equipment including fire extinguishers, personal protective equipment (PPE), etc
5. Provision of potable drinking water, and other hygiene facilities
6. Reporting of occupational accidents to appropriate government agencies.



Other national legal instruments such as Factories, Offices, and Shops Act 1970 (Act 328), the Mining Regulations (1970: LI 665), The Ghana Workmen's Compensation Law 1987(PNDC 187), the Atomic Energy Commission Act, 2000 (Act 588), the Environmental Protection Agency Act, 199 and the Radiation Protection Instrument (No. 1559 of 1993) regulate the safety and health of people and the environment in certain sectors of the economy (Agyemang et al., 2015; ILO, 2017). Again, according to Ghana's profile on the ILO website, Ghana has ratified 37 active conventions for labor standards in the country.

These ratifications and legal instruments are binding on Ghana's steel manufacturing industry which is a very critical part of the industrialization and development agenda of Ghana. According to the OHS policy guidelines provided by health stakeholders in Ghana and the World Health Organization (WHO), OHS systems in the country must include 5 key dimensions:

1. Preventive activities: These activities aim at preventing the incidence of injury and ailments. Preventing injuries and diseases in the workplace requires identifying risks, evaluating them and finding controls to deal with them.
2. Promotional activities: Promotional activities include educating and training employees to adopt safe and healthy attitudes.
3. Curative activities: Curative activities aim at providing treatment in all forms for ailments such as provision of first aid.
4. Rehabilitation activities: These activities are those that ensure that affected workers regain or acquire new competences to order to return to work
5. Research activities: Research activities deal with investigations into usual risks, conditions, diseases and injuries specific to a sector or industry.

Despite existing ratifications, policies and regulatory bodies, Ghana's performance in OHS in various workplaces and sectors leaves much to be desired. Rai et al. (2021) and Aluko et al. (2016) note that although there are strategies to reduce risks of exposure to occupational hazards in most workplaces, compliance is often low due to a shortage of equipment, inadequate staffing, and lack of training. Annan, Addai and Tulashie (2015) and KATH (2019) suggest that the lack of adequate research and documentary attention to OHS, the absence of an effective national policy and the

fragmentation of efforts under different institutions are critical factors behind Ghana's uninspiring performance in OHS.

### **3.3. Empirical Review: OHS and Productivity**

Ivancevich (2015) cites work type, attitude of workers, existing economic conditions, management objectives and the impact of worker unions and the government in ensuring safe and healthy workplaces in a state. Cole (2013) accepts that the key role legal and regulatory instruments from governments in OSH promotion but contends that in most cases, it is the management of organizations themselves who truly dictate the health and safety conditions of workplaces. Bentil (2018) hints however that managers in Third World countries, unlike more developed countries, generally do not usually give much attention to OHS and lack the infrastructure, funding and expertise to execute OHS. Ivancevich (2015) highlights that manager of organizations in Africa, for example are usually willing to overlook unsafe work environments while eyeing their political or capital profits. That is why the works of O'Donnell (2000) and Peterson et al (2011) contend that more empirical evidence should be found to support the claims that OHS has the potential to influence productivity.

Steel, Godderis and Luyten (2018) state that assessing OHS interventions focus on productivity loss which broadly refers to any reduction of the efficiency in production. In order words, productivity loss describes the state where less output is produced from a certain set of inputs. According to them, good OHS systems minimizes costs incurred in replacing sick or absent workers while ensuring that the expected outputs are not missed when replacements are not found. Increasingly, managers are accepting that OHS management systems reduce absences and performance loss due to work-related diseases and injuries (Ward, Haslam & Haslam, 2008). Peterson et al (2011) affirms same, stating that truly OHS has the potential to reduce the absenteeism, cut down costs of compensation for work-related injuries and ailments, as well as to enhance creativity, resilience and better output of goods and services, which in turn will accrue as profits for business owners. It can create a better job climate and organizational relations which motivates workers to better perform their duties. O'Donnell (2000) adds that greater productivity and profits then ultimately will improve safety and health conditions of the organization.

The International Labour Organization (2015) avers that employers invest very little or nothing in health and safety systems, it leads to more injuries, near-accidents and actual accidents. This

situation, according to the organization, ultimately leads less productivity. By extension, higher investment in (OHS) reduces reduces lost hours/days due to ill-health, improved employee motivation while eliminating some of the costs related to insurance and compensations. Bergström (2005) fears that it can be too simplistic to truly and practically attribute productivity in an organization to successful OSH systems since in most cases, the management apparatus may have implemented several other projects alongside the OSH system.

Productivity as a measure is simply estimated by dividing the outputs of a company by the inputs used in producing that output. Usually, labour hours are considered as input while unit produced or sold by the company are considered as the output. Steel et al. (2018) also state that in measuring the impact of OHS systems, practices or interventions on productivity, it is important to measure productivity or productivity loss. Most studies estimate productivity by focusing on data on labour inputs. That is, volume (hours worked) and quality (human capital) of work done. Alternatively, studies measure absenteeism and presenteeism and estimating costs for lost-work-time and lost performance.

There is in fact growing and compelling empirical evidence all over the world that suggests that OHS systems positively impact job performance and productivity. Badekale (2012) reveals that effective safety and health systems or programs deal with unsafe practices and eliminate or minimize health care costs that come with illnesses and injuries to employees. He concludes that there is a positive link between OHS policies and the performance of employees in Larfage (WAPCO) Ewekoro, Ogun State in Nigeria. Abuga (2012) based on a case study at Pyrethrum Board in Kenya concludes on a similar note. He however adds that for safety and health programs to be effective, it is ideal that employees are involved in planning them. Jelimo (2013) conducted descriptive research on the effects of OHS practices on employees' productivity. The study found out that occupational safety and health practices has a positive relationship with productivity of employees.

Ayu et al. (2021) also discovers a positive link between occupational health and safety culture and productivity. In their study of heavy equipment workers of a state-owned port business in Indonesia. Knowledge of OHS systems motivates employees "to work more optimally in completing their work", it makes "employees happy at work which can ultimately increase work productivity" (Ayu et al., 2021:5). A study by Kane-Berman (2017) in South Africa cites a case

where production losses of about 2000 ounces of platinum were incurred due to a factory shutdown because of fatalities on a mining site.

In Ghana, however, this area of research is still quite new. A few studies have looked into OHS and its effect on employee performance in the mining industry (Amponsah-Tawiah, 2016), agro-processing industry (Nyoh, 2015), the meteorological service (Clegg, no date), and timber industry (Dwomoh, *et al.*, 2013). All these studies conclude that health and safety systems influence employee performance. Dwomoh *et al.* (2013) however note that there is only a weak correlation between OHS policies and employees' performance.

Unfortunately, there appears to be only a few studies that have explored the important relationship between work safety and health and the matter of productivity in the steel manufacturing industry. Berhan (2020) explored the impact of Management commitment and its impact on occupational health and safety improvement in iron, steel and metal manufacturing industries in Ethiopia. He concludes that in most cases, Management was committed to improving OHS and this was well received by employees.

Nordlöf (2015) also assessed employee perspectives of safety culture and reasons for risk-taking in a steel-manufacturing company. According to them, workers at a steel company may take more risks due to lack of experience, tiredness, nonchalance, routinization of work processes, low-staffing, and fast paced working. Among other conclusions, the study discovered that workers in steel-industry workers are normally danger-tolerant. They usually understand and accept the inherent risks involved in their job and take it as their responsibility to deal with them. The researchers also note that in some cases, workers are fatalistic, believing that nothing can be one better to improve safety and that accidents cannot be avoided altogether. For such workers, safety protocols are not really obligatory since accidents will still happen anyway. For even some, safety protocols limit creativity and improvisation necessary to keep production going when a challenge arises due to practical challenges like with a lack of or malfunctioning of equipment or machinery being used. Nordlöf and his colleagues also found that there is often a friction between safety and expectations for productivity (Nordlöf, 2015). That is, workers surveyed believed that management expect productivity and seem to prioritise it over safety concerns. Thus, Management is often insistent on keeping production ongoing as much as possible even if a safety concern may be in the picture. In most cases, improvement to safety systems will only follow an accident or a

near-miss. Again, workers themselves are interested in productivity and sometimes may put it first before their safety. Workers will thus improvise when the safe way to get the job done is not unavailable in order to ensure that production continues.

Krishnamurthy et al. (2017) in their study on a steel plant in Southern India concludes that heat as a hazard was a huge threat and influence on the attendance and performance of workers. The study measured the level of productivity loss due to heat stress. In the study productivity loss was equated to not meeting set job targets, loss in production, loss of work hours/days due to ill-health and/or wages lost due to heat-related ailments. The study focused on perceptions of the workers on how heat stress affected their health and reduced their capacity to work.

In a similar vein, Kaynak et al. (2016) examined the impact of occupational health and safety (OHS) practices on three main variables in private sector enterprises: work alienation, organizational commitment, and job performance. In the study which was undertaken on a sample of employees from the small and medium scale production and services industry in Kocaeli, Turkey, they discovered that OHS practices as risk management and safety procedures, safety and health protocols, training and support for first aid support as well as organizational support for safety improved employees' commitment to their organizations, and affected work alienation to an extent, increasing or decreasing it under the five different dimensions. Consequently, this increased employee commitment also increased job performance.

Bristot et al. (2020) found out that workers in the finishing department recorded the most number (53.03%) of accidents, followed by the workers in the molding sector and melting departments. The accidents according to the survey were mainly due to unsafe working conditions, unsafe behaviours and personal factor with unsafe conditions like lack of space at the workplace being the biggest contributor. The findings of Bristot et al. (2020) also showed that accidents rates can still escalate despite the presence of OHS management systems as workers can engage in unsafe acts due to their own recklessness, malpractice or negligence. They found that despite OHS systems, 10.45 accidents occur annually, with these accidents happening in tandem with an average annual rate of 63 days of absences. At the end of the study, they recommend that beyond putting in place safe conditions at the workplace, employees should be serious about the instruction, training, monitoring, and instituting working reward and sanctions for workers in order to ensure compliance to safety protocols while performing their duty.

In a study of 50 workers each from 40 iron manufacturing entities, Bharwana et al. (2019) discovered that 76% workers in the industry were ignorant of safety measures while more than half of them do not make use of Personal Protective Equipment (PPEs) in the course of their work. According to the study, noise is one of the main safety and health concerns for workers but despite this, the employers did not provide PPEs to mitigate the unhealthy noise at the workplaces. Again, only a small number of employees of the iron manufacturing entities (12%) received any form of safety training before assuming their present jobs. For majority, they gained knowledge of the nature of their job and its risks through by personal observation. This state of affairs, the authors conclude, explains the high incidence of accidents at the workplaces. Bharwana et al. (2019) however does not relate the state of OHS at the factories to employee performance and productivity. Unlike Bharwana et al. (2019), Bwengye (2021), in his study on a steel manufacturing plant in Uganda, links higher investments in occupational health and safety to reduced injuries and diseases and reduced lost days as well as increased performance and productivity. Umugwaneza et al. (2019) discovered similar trends in a Rwandan steel manufacturing company.

In the case of Ghana, similar studies have provided a general overview of Occupational health and safety issues in the informal manufacturing sector (Nana-Otoo, 2016). Others have measured the impact of OHS on employee commitment and ultimately turnover intention in the Ghanaian power industry (Liu et al. (2019) and on employee performance in the mining industry (Amponsah-Tawiah and Mensah, 2016), agro-processing industry (Nyoh, 2015), timber production industry (Dwomoh, *et al.*, 2013).

No known study has however examined the impact of OHS on employee performance/productivity in the steel manufacturing industry in Ghana. There is a need therefore for an in-depth and rigorous study that fills this knowledge gap. It is expected that the present research with its unique case will reveal richer insights that add to knowledge on the importance of occupational safety and health systems.

### **3.4. Theoretical Framework**

#### ***A. Social Exchange theory***

The study will make use of the Social Exchange theory. The theory was developed by George Homans, appearing first in his essay, “Social Behavior as Exchange” in 1958. The theory has been applied to many different situations including romantic relationships, friendships, workplace behaviour, organizational management, leadership and consumer behaviour.

The theory stipulates that social exchange occurs between two or more actors based on their dependence on one another for a valued benefit (Molm, 2014). In this study, the social exchange theory will be applied to assess the relationship between an individual and an organization. Based on the basic assumption of the social exchange theory, an employee and the organization exist in a “give-and-take” relationship where both actors can offer a resource that the other values. The theory suggests that employees commit to their jobs and perform at a higher level based on the perceived benefits they get from the operations of the organization. That means that workers who feel that their managers care about them and sees their inputs as valuable will show higher levels of job satisfaction, commitment and ultimately productivity (Turunç & Çelik, 2010). Based on the social exchange theory, workers can interpret an organization’s commitments and investments in occupational safety and health interventions as benefits and thus reciprocate this value by working more productively towards the organization’s goals.

This study will apply this theory to examine how occupational safety and health systems impact worker performance.

#### ***B. Maslow’s Theory of Needs***

This study will also employ the Maslow's theory or hierarchy of needs as part of its theoretical framework. The theory, first proposed by Abraham Maslow in his 1943 paper, “A Theory of Human Motivation”. The theory posits that humans are motivated by the different kinds and levels of needs they seek to satisfy. Maslow’s theory (1943) avers that there are five levels of needs which are illustrated in an order from the bottom of a pyramid to its top. The hierarchy moves from the bottom which starts from (1) physiological needs to (2) safety and security needs and to (3) social needs. The final two are the top of the pyramid are the (4) esteem needs and then finally, (5) self-

actualization needs. The theory states that people in their bid to satisfy the needs they have will move through those needs in a hierarchical order. This order begins with the most basic needs (bottom of the pyramid) before moving on to more advanced needs (top of the pyramid).

Though Maslow's theory is more popular in psychology, it has been applied in studies on economics since it is preoccupied with needs in the same way economics is. In this study, Maslow's theory of needs will be applied as it suggests the lower needs such as safety needs must be fulfilled before the higher ones like the social and self-actualization needs. In that sense, workers will have to be safe (and healthy) first before they can be motivated to perform effectively at the workplace.

### **3.5. Conceptual Framework**

More and more organizations are beginning to take OSH impact analysis seriously. Increasingly, managers are assessing how much OHS management systems have reduced absences and performance loss due to work-related diseases and injuries (Ward, Haslam & Haslam, 2008). To these organizations, it is important to match their investments in OHS management systems with actual profitable outcomes that reflect on productivity and further organizational goals.

Basically, analyses of the impact of OHS management systems on workplace productivity seek to measure how much inputs from the organization translate into output. Inputs which refer to economic costs incurred by an organization are usually easy to ascertain and quantify, on the other hand, outputs may be very subjective, less tangible and difficult to measure (Niven, 2002; Miller, Rossiter & Nuttall, 2002). Miller and Murphy (2006) have noted that measuring outputs requires a holistic approach that measures both objective variables such as absence as well as subjective variables that consider employee attitudes. Per Ward, Haslam and Ward (2008), despite the difficulty involved, the assessment of employee outcomes of OHS management systems is gaining momentum in both academia and industry. They note that several of the studies on this aspect of OHS studies apply the social exchange theory and perceived organizational support as key models on which OHS impact is measured. These theories aver that how workers perceive their treatment by employers influences their attitudes to work. Workers who feel well treated by their organisation 'repay' the organization by displaying more positive attitudes and behaviours to work which in turn leads to higher productivity. Organizations that show support and commitment for the health and safety of employees by putting in place protocols and practices to safeguard



employee health and safety reap benefits in the form of desired job outcomes (Nkrumah et al., 2021). On the other hand, Katsuro et al. (2010) state that when employees become resentful of management when they realize that management is not committed to their health and safety. They add that this situation reduces workers' motivation to work well and stay committed to the organization (Katsuro et al., 2010). Katsuro et al. (2010) reveals that in developing countries, where workers who realize the high health risk inherent in their jobs and the poor occupational health and safety systems will normally quit. On the contrary, and unfortunately in most developing countries, employees will rarely leave their jobs because of health and safety concerns. Workers who leave their jobs are most likely going to find it hard or even impossible to find new jobs due to the high rates of unemployment prevalent in most developing countries. They will thus rather stay with a job that puts their safety and health at risk, than risk being without a job and the income it comes with (Katsuro et al., 2010).

While, it may be hard to objectively measure OHS impact on productivity, tools such as the Work Limitations Questionnaire (WLQ), the Stanford Presenteeism Scale (SPS), Health and Performance Questionnaire (HPQ) and the Work Productivity and Activity Impairment Questionnaire (WPAI) have proven helpful (IBI, 2011, HESAPRO, 2013; Koopman, 2014). They serve as surveys that rely on self-reported information to assess the link between health of employees and productivity by focusing on certain measures such as absenteeism and presenteeism. Typically, the measure of absenteeism, that is the number of days or hours of work one misses due to ill-health, constitutes several assessments of productivity losses (HESAPRO, 2013; IBI, 2011).

The understanding is that if a worker misses work or some hours of work, the time lost reduces productivity. In 2014, the Society for Human Resource Management (SHRM) partnered KRONOS Incorporated to undertake a survey of 733 respondents sourced from the stakeholders of the two collaborators. They attempted to gauge the financial impact of employee absences. In the end, the study concludes that the absenteeism of a particular worker can reduce the productivity of co-workers, supervisors and an entire organization (SHRM, 2014). Supervisors' productivity suffers as they spend time away (about 4.2 hours every week) from their actual supervisory role in order to deal with absences, especially while adjusting workflow and looking for replacements for absent workers. Akin to a domino effect, the study avers that in companies where work is done in a team,

the team might lose usual momentum while taken up the added burden of the duties of the absent member. Even when replacements are made, the replacement worker may not be as productive as he or she could be less familiar with machinery or processes necessary for the job to be done.

McCunney (2001) corroborates this through the assertion that main means by which occupational health and safety influences productivity is by reducing absenteeism. While HESAPRO (2013) accepts that this is true, they note that several studies have shown that using only absenteeism as a measure may distort the findings of a research.

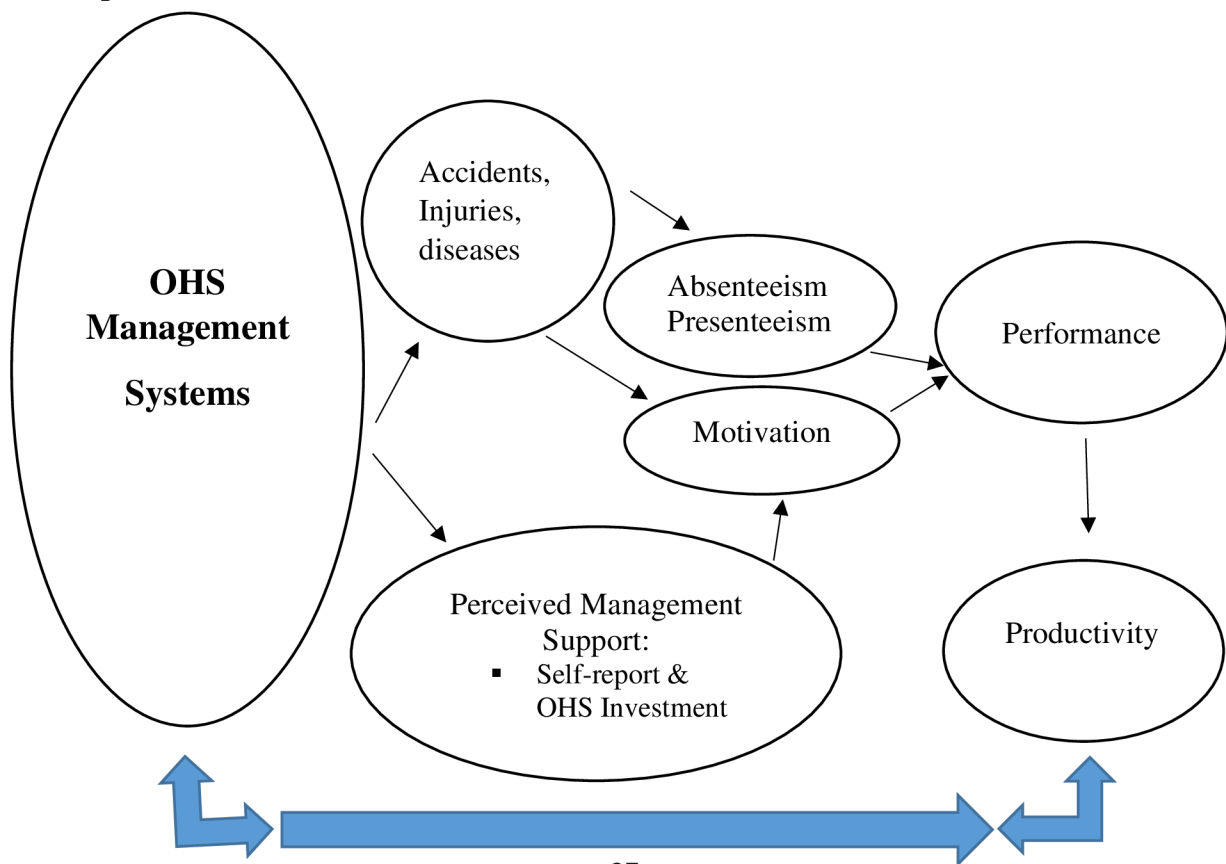
Newer studies of the link between health and productivity are now assessing presenteeism (IBI, 2011; HESAPRO, 2013). Presenteeism refers to the situation where an employee is present at work but cannot or does not perform well because of physical, mental or emotional health problems. Katsuro et al. (2010) explain that some workers do not report their illnesses and may be unwilling to get medical treatment. In such a case, they will be present at the workplace but cannot perform to expectations since their health is sub-optimal. According to the Hemp (2004), on average, productivity loss due to presenteeism is 7.5 times more than losses related to absenteeism and three times greater than medical treatment costs. Even combined, both absenteeism and medical treatment costs are far less than productivity losses attributable to presenteeism (Dow Chemical, n.d. as cited in HESAPRO, 2013).

Absenteeism and presenteeism both focus on workers who have a work-related disease or injury and have “no performance” or “low performance” because of it. Koopmans (2014) indicates thus that measuring tools that focus on only these two indicators for measuring the OHS-performance relationship will be mostly not applicable to a healthy working population. This therefore requires complementing the two factors with another variable that can suitably be measure even for people without any health complaints. This study will include another indicator, motivation. Motivation has always been considered to be a predictor of performance in organizational settings. Motivation in an organization can refer to “any work-related factors that can influence the maintenance of positive work behaviours expected to enhance productivity” (Nkrumah et al., 2021). Essentially, people perform optimally when they are convinced of the benefits they will or have already derived from such work activities. Several studies have concluded that OHS management can be a source of motivation that leads to higher performance and productivity (Koopman, 2014; Bawa, 2017; Nkrumah et al., 2021). Nkrumah et al. (2021:7) conclude that when OHS systems are in place and

functioning, workers will now have the “interest, willingness and dedication to work”. Maslow’s theory of needs, for example, states that needs are arranged in a hierarchical manner so that the lower needs such as physiological and safety needs must be fulfilled before the higher ones like the social and self-actualization needs. In that same sense, workers will have to have their safety needs met first before they can be motivated to perform effectively at the workplace. Katsuro *et al.* (2010) also adds that satisfaction with OHSM system can motivate workers to put in their best at the workplace. A management group’s investment in an OHSM system in itself is a signal to employees that their organization values them and their inputs (Katsuro *et al.*, 2010). This in turn boosts their morale to perform better on their jobs, leading to higher productivity.

As seen in the conceptual framework that follows, this study will assess how workers of B5 Plus respond to the risk of, or actual work-related accidents, injuries and diseases in the light of perceived management support in OHS. Through this assessment, it will be ascertained what impact OHS management systems have on absenteeism, presenteeism and motivation as predictors of job performance and productivity in the case of B5 Plus as the selected manufacturing company.

**Conceptual Framework.**



#### **4. Practical Part**

The practical part in this study involves an analysis of the selected company for the case study, and details of the data collection and analysis of data collected using mixed method of questionnaires and interviews in answer to the three research questions of the study.

##### **4.1. Detailed Description of Case Study: B5 Plus Steel Manufacturing Company**

The study was undertaken using the B5 Plus Steel Manufacturing Company as a case study. The company is the biggest steel manufacturer in Ghana.

The company's headquarters is its Tema office area, which is the focus for this study. B5 Plus Group was founded in 2002 with the vision to become the best in the steel manufacturing company that serves several countries in West Africa. By 2018, the B5 Plus was being considered as the largest iron and steel company in Ghana with a wide network of supply throughout Ghana and across West Africa.

The company supplies mild steel, galvanized products, stainless steel products, steel balls for the marine and mining sector, and products such as iron rods, roofing sheets, metal mesh and wire products for construction and fencing (Steel on the net, 2022). The Group employs more than 1,000 workers both directly and indirectly and has its state-of-the-art steel manufacturing plants in Ghana enrolled under the government of Ghana's flagship programme known as the One District-One Factory (1D1F) as part of efforts to improve industrialization and promote the patronization of "made in Ghana" products (Macropolis, 2022)

According to its website, B5 Plus is certified with the ISO 9001:2015 QMS (Quality Management System). In 2021 and 2022, the company was adjudged Manufacturing Company/Brand of the Year with its Chief Executive Officer (CEO), Mr. Mukesh Thakwani, being honoured as Ghana's most respected CEO (2021) at the Ghana Business Awards. The awards ceremony aims to recognize and appreciate the efforts of individuals and companies that are making giant stride in the development of their industry. B5 Plus was also awarded as the best Covid-19 Healthcare response company of the year in the same year at the Sustainability & Social Investment awards, 2021, for offering free oxygen refills to hospitals in the peak of the pandemic in Ghana (Business Ghana, 2021).

## 4.2. Results – Qualitative Aspect

This section presents the results and analysis of the qualitative aspect of the research. The qualitative aspect comprises a look at the demographics of the respondents, the identified themes and data collected from in-depth interviews

The interviews were conducted on Zoom with each of the five managers in the B5 Plus Steel Manufacturing company. The interviews were to collect data to understand the perspectives of Management members of the Steel Company on OHS management systems and their effect on workers and the overall productivity of the company.

The demographic characteristics of the participants are illustrated in Table 1 below:

**Table 1: Demographics of Respondents**

Respondents	Role	Gender
Respondent 1	Production Manager	Male
Respondent 2	Safety Officer	Male
Respondent 3	Head of Finance	Male
Respondent 4	Human Relations Manager	Male
Respondent 5	Head of Supervision	Male

Source: Field Data (2023)

### 4.2.1. Results from the interviews

Analysis of the qualitative phase began by thoroughly reading through the transcriptions. Among other more specific questions based on their specific roles, each member of Management interviewed was asked three main questions: (1) “How will you describe the quality of OHS at B5?”; (2) “To you, how important is OHS to workers?”; and “Does OHS affect worker performance and productivity?” Four main themes were generated from the transcribed recordings. The themes include perceptions of the state of OHS at B5 Plus, effects of effective OHS, non-compliance to OHS systems as well as ongoing absenteeism and presenteeism at B5 Plus. These themes are summarized on the table below:

**Table 2: Summary of Themes from Interviews**

Label	Themes
A	Perceptions of the state of OHS at B5 Plus
B	Impact of effective OHS management
C	Non-Compliance to OHS Systems
D	Absenteeism and Presenteeism at B5 Plus

Source: Field Data (2023)

### **A. Perceptions of the state of OHS at B5 Plus**

Considerations about OHS are in the top agenda of B5 Plus. They seemed to be a clear consensus among all members of management interviewed about how risky the work in a steel manufacturing company is. understand the risky nature of “the production we undertake”.

Due to the inherent dangers of the job, Managers of various key departments interviewed firmly believe in investing in OHS management systems. The Human Resource Manager at B5 Plus revealed that it was a “key component in the company’s operations”. He notes that even from the onset, during recruitment, he considers the health status and fitness of applicants as a major criterion due to the nature of our operations.

Almost all respondents acknowledged that there have been significant monetary investments in OHS management in the company. The Production Manger notes that “a lot of money goes into it” while the Human Resource Manager indicates that the company “invest heavily into OHS systems and also because of our productivity”. The Head of Finance Officer however reveals that:

We have a large budget allocation to OHS but I will say it’s not enough due to the nature of the operations of the company and the number of workers we have in the various departments

The safety officer also adds since work-related accidents still occur, there is the need to do more. He states that:

*The company has a yearly budget for the safety department but not enough most often due to increasing number of work-related accidents and the compensations.*

The Finance Officer suggested that there were already talks with higher Management to “increase the yearly budget allocation to the safety department because they will mostly pay huge compensations to workers”.

According to the Safety Manager, over the years has always provided safety equipment and protective clothing for workers. He however concedes that due to constraints on their budget, they are unable to provide them for everyone. Per the Safety Manager, B5 Plus is committed to recording work-related accidents. He notes that accidents can be very severe even leading to death as well as the destruction of company infrastructure. The Production manager adds that accidents, mostly occur “almost every day” “in almost all the production units of B5”.

Almost all the respondents acknowledged that while a lot had already been done well in terms of the OHS management systems at B5 Plus, there was still a lot to be done because accidents and deaths were still occurring among the employees of the company.

The Production Manager and Safety manager work together to ensure compliance to OHS rules like wearing of PPEs, the Finance Department are concerned about budgetary allocations. The HR takes OHS into consideration during recruitment.

## **B. Impact of effective OHS management**

In response to the question of whether OHS affects worker performance and productivity, all the managers affirmed their recognition of the importance of OHS to the performance and productivity of workers at B5 Plus. According to the Production Manager: “workers work better when they are healthy and also when they can work freely without fear on any harm coming to them”.

According to the Finance Officer, he finds the investments in OHS so far at B5 Plus to be worth it. He states that:

*The investment in OHS has impact on the operations. Because without it, we will have fire outbreaks within the organization and loss of human life. Also, OHS systems have an impact on productivity because our productivity began to increase when we improved our investment in OHS.*

The Human Resource Manager revealed that the workload and demands at B5 Plus require workers to be in optimum health. He noted that workers needed to be strong and fit since they had to “work here for 8 hours every day from Monday to Saturday”.

On the effect of the employee performance and productivity, he pointed out when the OHS systems are working, they have effects on individual workers, the organization and the environment. He stated that:

*It gives employees at all levels the sense of security of work. This has a great impact on productivity. Also, it saves the company from losses and even the environment because some work-related accidents can lead to environment hazards.*

When asked if workers were satisfied with the OHS management systems put in place by Management, he responded that “Yes. Because we invest heavily into OHS systems and also because of our productivity”.

Per the submission above, the Human Resource Manager believes that the company’s productivity was evidence that the workers were satisfied with systems put in place and also the fact that the company had invested heavily in OHS. To him, OHS systems turn into productivity because “when workers are aware that there are proper OHS in place, the worker works freely without fear.”

On his part, the Head of Supervision, when asked what OHS systems mean to workers, disclosed that “without the OHS system put in place by the safety department, all of us are in trouble”. He added that OHS systems protect workers from “accidents and from danger” and gives them a positive feeling that allows them to work with no fear.

### **C. Non-Compliance to OHS Systems**

The responses from the interviews suggest that Management had done a lot to put in place some OHS management systems but in some cases these systems do not work as they should due to non-compliance among workers.

The Safety Manager for example notes compliance is not optimum as some of the workers do not comply with safety protocols. He explains further that, due to non-compliance with OHS systems, work-related accidents are recorded at the workplace on a frequent basis.



The Head of Supervision notes the fact that workers are men made some of them choose to work without PPEs without any concern of a possible accident and danger to them. He adds that only a few workers for example will complain when they do not have PPEs to work with for fear of danger. Most workers do not actually complain when there is a lack of PPEs at B5 Plus because they are “men and they are fit so they can do a lot without being afraid”. The Human Resource Manager lastly revealed that non-compliance can even lead to the dismissal of a worker. Similar to this discovery, Nordlöf (2015) also found high levels of non-compliance among steel workers he surveyed. He explained that usually, male workers because of the expectations of their gender and group norms take more risks and may not comply with safety rules and regulations. Not insisting on getting and using a PPE when one is available may be a sign of a fatalistic perspective, or of an attempt to show one’s creativity and improvisation to get a job done.

#### **D. Absenteeism and Presenteeism**

The Production Manager bemoans the still occurring rates of absentees due to health problems among workers but indicated that he understands that it comes with the nature of the job.

He highlighted the fact that the company has a production rate between “700, 000 to 1,000,000 metric tonnes of steel yearly”. However, despite this, he notes that in most cases, absences due to sickness or injuries affect work and do not allow the company to meet its production target. In his own words, he stated:

Even though absences from work have reduced because we try not to let it happen. But we get absentees with workers complaining about all sort of things. And I don’t like that but that is what happens due to the nature of our work. You can’t force them to come to work by force. Especially if it is a bad injury. And but you know, this is a large company so when someone is absent and gets permission from the superior. No problem. Work continues.

The Production Manager adds:

We try to do our best to meet our targets. But sometimes we meet them and other times, we don’t. Actually, most of the time, we are unable to hit our targets. That’s why we try to do more. Not just in OHS, we try to get more work done and more products to service our customers.

The production manager's words about "trying to get more work done" speaks of ways of compensating for an absent worker. He however suggests that compensating does not often work as well since targets at the end of the day are usually not met.

The Head of Supervision adds also that:

Sometimes, when doing my rounds, you will see some people being lazy with their work and they will tell you they are not OK or they have been injured. They are men so you can try to be hard on them but you can't force them too much to work

To the Head of Supervision, indicating to a supervisor that one is sick is a way sign of "being lazy". Despite this, his words suggest that he acknowledges the fact that sick or injured workers often have a reason not to work and are often left alone and not forced to work. Despite not, mentioning the term "presenteeism", the Supervisor hints at it, while noting the fact that unwell workers could sometime be seen barely doing any work while present.

### **4.3. Results – Quantitative Aspect**

This chapter reports the results of the study. The questionnaire administered was meant to collect the background information of employees of B5 Plus Steel Manufacturing Company and also interrogate respondents on themes related to the main research questions stated in this study. Mainly, respondents were to identify the causes of accidents and risks in the working environment of B5 Plus, the various occupational safety and health systems in place there and the effect of these systems on their performance and productivity.

#### **4.3.1 Results from Questionnaire**

This section deals with the results from the responses to the questionnaire.

#### **4.3.2. Background Information of the Respondents**

This section presents information on the background of the respondents who are also employees of B5 Plus Steel Manufacturing Company.

All 299 questionnaires forms required per the sample of the study were completed. The response rate was thus 100% which was likely to give an accurate representation of the population of study. Question 1-6 of the questionnaire were used to obtain information on the characteristics of the respondents which comprised gender, age, number of years worked, job description, educational qualification and department. Table 3 which follows shows the summary of the demographic data.

The results show that 234(78.3%) of the employees who responded to the survey were males whilst 65(21.7%) were females. This means more male employees took part in the study than females. This is in keeping with the typical male dominance in the metal manufacturing industry. Majority of the respondents (65.2%) of those interviewed were aged between 21 to 30 years followed by 29.1% of them aged between 31-40 years. Only 20 respondents have worked at the company for more than 11 years with 93.3% having worked there between less than or up to 10 years. Almost half of the workers (43.1%) who responded to the survey are hired on a permanent (full time) basis while 38.5 of them are recruited as casual or on contract. 132 of the respondents, representing a majority (44.1%) have the senior high school certificate as the highest educational qualification. 32% of the employees in the survey hold a degree while 15.1% have obtained postgraduate degree. The administrative department which includes units responsible for marketing, human resource, secretariat among others recorded the highest number of respondents (64) amounting to 21.4% of

all the respondents. This was followed by the Transport, Fabrication and Civil departments which recorded 40 (13.4%), 39 (13%) and 33 (11%) respondents respectively (Table 3).

**Table 3: Demographics of the Respondents at B5 Plus**

<b>Respondents(N=299)</b>	<b>Number</b>	<b>Percentage</b>
<b>Gender</b>		
Male	234	78.3
Female	65	21.7
<b>Age</b>		
21-30 years	195	65.2
31-40 years	87	29.1
41-50 years	16	5.4
51 years and above	1	0.3
<b>Number of years worked at B5 Plus</b>		
0-10 years	279	93.3
11-20 years	8	2.7
21-30 years	11	3.7
31 years and above	1	0.3
<b>Job description</b>		
Permanent (Full time)	129	43.1
Permanent (Part-time)	55	18.4
Contract /Casual	115	38.5
<b>Education/Qualification</b>		
JHS	20	6.7
SHS	132	44.1
Degree	96	32.1
Postgraduate degree	45	15.1
Vocational Certificate	4	1.3
Other	2	0.7
<b>Department</b>		
Civil	33	11.0
Fabrication	39	13.0
Transport	40	13.4
Electrical	31	10.4
Male Factory	21	7.0
Iron Factory	28	9.4
Vulganizing	6	2.0
Petroleum	16	5.4
Tube Mill	5	1.7
Administration (Marketing, HR, Secretariat, etc.)	64	21.4
Other	16	5.4
<b>Total</b>	<b>299</b>	<b>100.0</b>

*Source: Field Data, 2023*

#### 4.3.2.1. Causes of accidents and risks in the working environment of the B5 Plus

Question 7 of the questionnaire was to solicit answers that could be used to satisfy the first research objective of the study which was to determine the causes of accidents and risks in the working environment of the B5 Plus. The responses of the respondents are presented in Table 4 below:

**Table 4: Causes of Accidents and Risks at B5 Plus**

Causes of Injuries and Diseases	Frequency (N)	Percentage (%)
Manually lifting of heavy objects	107	35.8
Doing repetitive movements for long	44	14.7
Uncomfortable work posture	49	16.4
Standing for too long	21	7.0
Too much work load	11	3.7
Toxic chemicals, liquids and gases	16	5.4
Confined spaces	10	3.3
Slips/Trips/Falls	9	3.0
Extreme heat	5	1.7
Electrocution	4	1.3
Fire or Explosions	9	3.0
Cuts	3	1.0
Experienced of Sexual Violence	2	0.7
Experience of Being Bullied or Beaten	6	2.0
Other	3	1.0

Source: Field Data (2023)

The results indicates that, out of the 299 respondents who took part in the present study, 107(35.8%) of them associate causes of injuries and diseases at B5 Plus to manually lifting of heavy objects, 44(14.7%) to doing repetitive movements for long, 49(16.4%) to uncomfortable work posture, 21(7.0%) to standing for too long, 11(3.7%) to too much workload, 16(5.4%) to toxic chemicals, liquids and gases, 10(3.3%) to confined spaces. 9(3.0%) of the respondents also chose slips, trips and falls, 5(1.7%) to extreme heat, 4(1.3%) to electrocution, 9(3.0%) to fire or explosions, 3(1.0%) to cuts, 6(2.0%) experienced bullying or beating. Two female (0.7%) employees indicated that they had experienced some sort of sexual violence while 3(1.0%) associate accidents, illness and injuries to other causes.

#### **4.3.2.2 Occupational safety and health management systems in the B5 Plus Steel Manufacturing Company**

The second research objective of this study was to identify the various occupational safety and health systems at B5 Plus. Questions 8-16 were thus used to investigate what occupational health and safety systems were in place at the B5 Plus company. Respondents chose responses on a Likert scale that meant the level of agreement or disagreement with statements given. The statements given included: *Q8. Everyone receives the necessary workplace health and safety training when starting a job, changing jobs or using new techniques*”, *Q12. There is an active and effective health and safety committee and/or worker health and safety rep* and *Q16. Emergency response measures like provision of first-aid kits and emergency exits etc are provided*. The responses of respondents to each question are presented in Table 5.

Results in Table 5 below reveal that majority of the respondents 159(53.2%) agreed that everyone receives the necessary workplace health and safety training when starting a job, changing jobs or using new techniques whereas few of them 58(19.4%) and 82(27.4%) remained neutral and disagreed respectively. This implies that employees of B5 Plus are given the necessary training on health and safety issues before they start a job, change jobs or use new techniques. Again, only few of the respondents 76(25.4%) agreed that there is regular communication between employees and management about safety issues whilst 69(23.1%) remained neutral with majority of them 154(51.5%) disagreeing. This implies that, though there exists communication between employees and management about safety issues, the communication is not regular.

Also, majority of them 174(58.2%) agreed that systems are put in place to identify, prevent and deal with hazards at work. However, 74(24.7%) of them chose to remain neutral with very few of them, 51(17.1%) disagreed. Additionally, the results show that, few of the respondents 57(19.1%) agreed that workplace health and safety is considered as important as productivity and quality service whilst 65(21.7%) were neutral with majority of them 173(57.9%) disagreeing. This implies that management of B5 Plus do not pay much attention to workplace health and safety issues as they do to productivity and quality service. Furthermore, 173(57.9%) agreed that there is an active and effective health and safety committee and/or worker health and safety rep whereas 66(22.1%) remained neutral with very few of them 60(20.1%) disagreeing. This indicates that, among occupational health and safety systems at B5 Plus, there is an active and effective health and safety committee and/or worker health and safety representative.

The results also showed that majority of the respondents 169(56.5%) agreed that when accidents and incidents occur at the workplace, there is quick investigation into it to ensure that immediate response is provided to combat it. However, 67(22.4%) were neutral whereas few of them 63(21.1%) disagreed. The results again reveal that only a small number of the respondents 50(16.7%) agree that communication about workplace health and safety procedures is done in a way that they can understand whilst 49(16.4%) remained neutral. Meanwhile, majority of them 200(66.9%) disagreed. This means that while communication about work place is done at B5 Plus, it is not clear and comprehensible enough for the workers.

Last but not least, majority of the respondents 191(63.9%) agree that all required Protective equipment (PPE's) are available to them when working, whilst 65(21.7%) were neutral with very few of them 43(14.4%) disagreeing. With PPE's, it is necessary for all workers to have them while working. Where a hazard cannot be totally eliminated, risks are reduced by controls such as the wearing of personal protective equipment. During the survey, it was discovered that majority of the respondents agree that all required Protective equipment (PPEs) are available to them when working. That notwithstanding, a good number of respondents were either neutral on this or disagreed, saying that PPEs were not always available to them while working. Finally, majority of the employees who took part in the study, 202(67.6%) revealed that emergency response measures like provision of first-aid kits, fire extinguishers and emergency exits are provided whereas 62(20.7%) remained neutral with very few of them 35(11.7%) disagreeing.

In a nutshell, results from the analysis indicate that among the various occupational safety and health systems available at B5 Plus include training of employees on workplace health and safety issues, putting systems in place to identify, prevent and deal with hazards at work, instituting active and effective health and safety committee and/or worker health and safety rep, quick investigation of accidents and incidents at workplace, provision of all required Protective equipment (PPEs) to workers when working and providing first aid kits, fire extinguishers and emergency exits etc.

**Table 5: Occupational Safety and Health Management Systems at B5 Plus**

<b>Statement</b>	<b>Strongly agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly disagree</b>
Q8. Training of employees on workplace health and safety issues	41 (13.7%)	118 (39.5%)	58 (19.4%)	63 (21.1%)	19 (6.4%)
Q9. Regular communication between employees and management about safety issues	63 (21.1%)	122 (40.8%)	69 (23.1%)	122 (40.8%)	32 (10.7%)
Q10. Systems are in place to identify, prevent and deal with hazards at work	41 (13.7%)	133 (44.5%)	74 (24.7%)	44 (14.7%)	7 (2.3%)
Q11. Workplace health and safety is considered as important as productivity and quality service	12 (4.0%)	45 (15.1%)	65 (21.7%)	129 (43.1%)	48 (16.1%)
Q12. There is an active and effective health and safety committee and/or worker health and safety rep	44 (14.7%)	129 (43.1%)	66 (22.1%)	50 (16.7%)	10 (3.3%)
Q13. Quick investigation of accidents and incidents at workplace	39 (13.0%)	130 (43.5%)	67 (22.4%)	48 (16.1%)	15 (5.0%)
Q14. There is clear communication about workplace health and safety procedures	12 (4.0%)	38 (12.7%)	49 (16.4%)	149 (49.8%)	51 (17.1%)
Q15. Availability of all required protective equipment (PPEs) when working.	51 (17.1%)	140 (46.8%)	65 (21.7%)	35 (11.7%)	8 (2.7%)
Q16. Provision of first aid kits, fire extinguishers and emergency exit etc.	59 (19.7%)	143 (47.8%)	62 (20.7%)	27 (9.0%)	8 (2.7%)

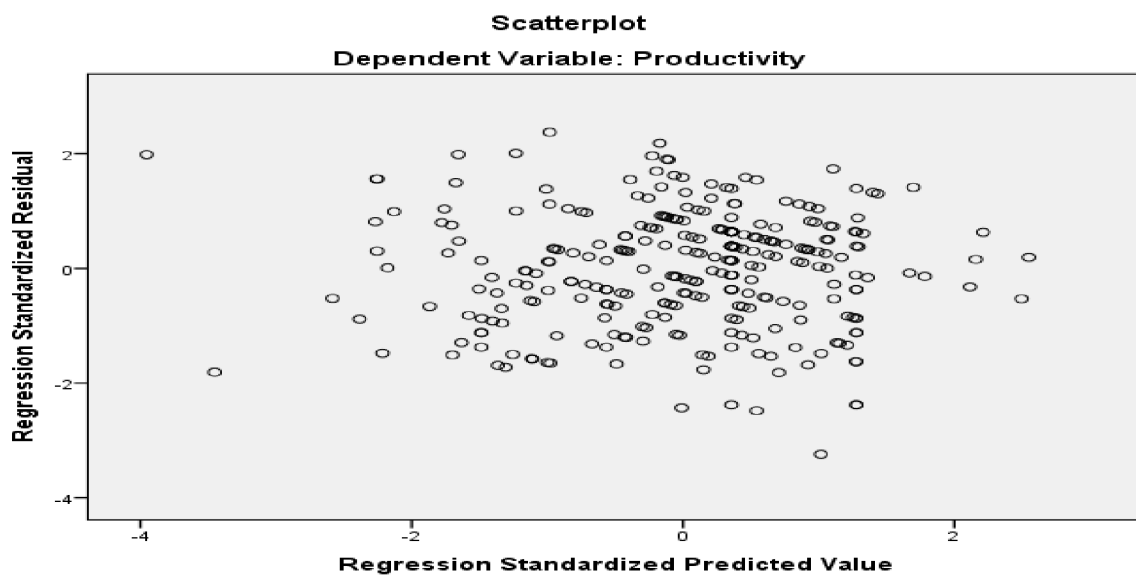
Source: Field Data (2023)



### 4.3.2.3 Effect of occupational safety and health management systems on the productivity of workers of B5 Plus

In order to assess the effect of occupational safety and health systems on the productivity of workers, regression analysis was employed. The results of the analysis are presented below.

*Figure 1: A Scatterplot of Linearity*



Source: SPSS generated (2023) based on survey

Firstly, linearity of the model was checked using scatterplots which proved that the relationship between the independent variables (Occupational safety and health systems) and the dependent variable (workers' productivity) can be modeled by a straight line suggesting that the relationship between these two variables is linear. This is shown in figure 1 above.

Collinearity diagnostics was also used to check highly correlated predictors variables if any. There is no threshold for acceptable values of tolerance and VIF. However, a commonly used rule of thumb is that VIF value greater than 5 or 10, or tolerance less than 0.2 or 0.1 indicates a high degree of multicollinearity among the independent variables. From the analysis, tolerance value (0.52) is greater than 0.2 or 0.1, and VIF value is 2.4 which is less than 5 or 10. This indicates that the independent variables are not highly correlated.

Again, Durbin Watson statistics was used to check for independence of residual values in Table 4. The Durbin Watson value was 1.759 which shows that there is no autocorrelation among the variables in this study as the value falls in a range of 1.5-2.5 (Bakon & Hassan, 2013).

**Table 6: Collinearity Diagnostics**

Tolerance	VIF	Durbin Watson
.519	1.927	1.759
.458	2.186	
.485	2.060	
.479	2.088	
.422	2.371	
.418	2.391	
.455	2.200	
.494	2.025	
.483	2.068	

Source: SPSS generated (2023) based on survey

Furthermore, a P-P Plot was used to check for homoscedasticity. The P-P Plot showed that the residual values are normally distributed as the dots are closer to the diagonal line in Figure 2 below.

**Figure 2:** Test for homoscedasticity (P-P Plot)



Source: SPSS generated (2023) based on survey

In addition, Cook’s Distance statistics was used to check for distribution of residual values which showed that all the values for each participant are less than 1, indicating that the model has no influential cases. Finally, the model was also checked for adjusted R-square in Table 7 below,

which showed R-square value to be 53.1% indicating that the model is a good fit. (Zygmunt & Smith, 2014; Field, Miles & Field, 2012).

**Table 7: Regression Test Result of Occupational Safety and Health Management Systems (OHSMS) and Productivity**

Model Summary										
Model	R	R Square	Adjusted R Square	Std. Error of Estimates	Change Statistics					
					R Square Change	F	df1	df2	Sig.	F
1	.485 <sup>a</sup>	.531	.502	3.976	.235	9.835	9	288	0.010	1.759

a. Predictors: Occupational Safety and Health Management Systems

b. Dependent Variable: Productivity

Source: SPSS generated (2023) based on survey

As in Table 8 below, the results show that the F value of the data is 9.835 (F=9.835) with the significant value being 0.010 (Sig. =0.010). Since the p-value (p=0.010) falls within the alpha ranges of 0.01 and 0.05, it is considered as significant (Imbens, 2021). This implies that the group of independent variables (Occupational Safety and Health Systems) when available can forecast the dependent variable (workers' productivity). In other words, where occupational safety and health systems are made available, workers' productivity level is likely to increase.

**Table 8: ANOVA Test Results of Occupational Safety and Health Management Systems and Productivity**

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1399.263	9	155.474	9.835	.010 <sup>b</sup>
Residual	4552.714	288	15.808		
Total	5951.977	297			

a. Dependent Variable: Workers' Productivity

b. Predictors: (Constant), Occupational Safety and Health management Systems

Source: SPSS Generated (2023) based on survey

Again, from the Table 9 below, constant or the y-intercept predicts the value of workers' productivity (dependent variable) when occupational safety and health systems are zero. This implies that without any unit change in any of occupational safety and health systems in the company's day to day activities, workers' productivity will be 13.46.

**Table 9: Multiple Regression Analysis - Coefficients of Occupational Safety Management Systems**

No	Model	Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
	1 (Constant)	13.463	1.126		11.955	0.000
Q8	Health and safety training	-.323	.281	-.082	-1.148	.252
Q9	Regular communication on safety issues	.120	.323	.028	.372	.710
Q10	Systems are in place to deal with hazards	-.710	.337	-.156	-2.105	.036
Q11	Health and safety considered important as productivity	.530	.316	.125	1.677	.095
Q12	Active and effective health and safety committee and worker rep	.594	.341	.138	1.743	.082
Q13	Incidents and accidents are investigated quickly to improve workplace health and safety	.565	.335	.134	1.687	.093
Q14	Communication about work place health is done in clear language	1.057	.331	.244	3.194	.002
Q15	All required PPEs are available when working	-.708	.333	-.156	-2.124	.034
Q16	Provision of first-aid kits and emergency exits	.874	.342	.189	2.553	.011

Source: SPSS Generated (2023) based on survey

A regression equation: workers' productivity '(Predicted) = 13.463 + (-0.323) Q8 + 0.120Q9 + (-0.710) Q10 +0.530Q11+0.594Q12 + 0.565Q13 +1.057Q14 + (-0.708) Q15+ 0.874Q16' is derived from estimates on the table. The p-values of a coefficient are acceptable when it is below the chosen alpha of 0.05. Consequently, a coefficient which has a p -value greater than 0.05 is said to be statistically not significant. The estimates in the equation reflects the proportion of increase or decrease in productivity (dependent variable) whenever there is a unit change in any of occupational safety and health systems (independent variables).

The regression equation suggests that a unit improvement in workplace health and safety training received when starting a job, changing jobs or using new techniques will result in -0.323-unit decrease in productivity when other occupational safety and health systems variables remain constant, as evident in Table 9 above. This is statistically insignificant as the P-value of 0.252 is greater than 0.05. Also, a unit improvement in communication on safety issues between employees and management will result in 0.120 increase in productivity which is statistically insignificant P-value 0.710 is greater than 0.05.

Again, from Table 9, all positive and negative B-values indicates an increase and decrease in worker's productivity when occupational safety and health systems are made available. The beta coefficients help to determine which of the variable have more effect as it predict coefficients that is standardized as it considers all the variable both dependent and independent variables on the same scale thereby making room to compare the variables. Regression analysis shown on Table 7 indicate that, when emergency response measures like provision of first-aid kits and emergency exits are provided (Sig. 0.011), when communication about work place health and safety procedures is communicated in a way that workers can understand and (0.02), when all required personal protective equipment (PPE's) are available when working (0.034) and when systems are in place to deal with hazards (0.036), workers' productivity will also increase. This is because the aforementioned occupational safety and health systems have significant values between 0.01 to 0.05 as seen in Table 9, indicating that they have significant effects on workers' productivity. Although, other occupational safety and health systems analysed in this study have been found to be insignificant, they have positive (greater) impact on workers' productivity anyways. Finally, from the analysis of data, it has been revealed that occupational safety and health systems has a positive significant effect on workers' productivity in B5 Plus. This means, when systems are put

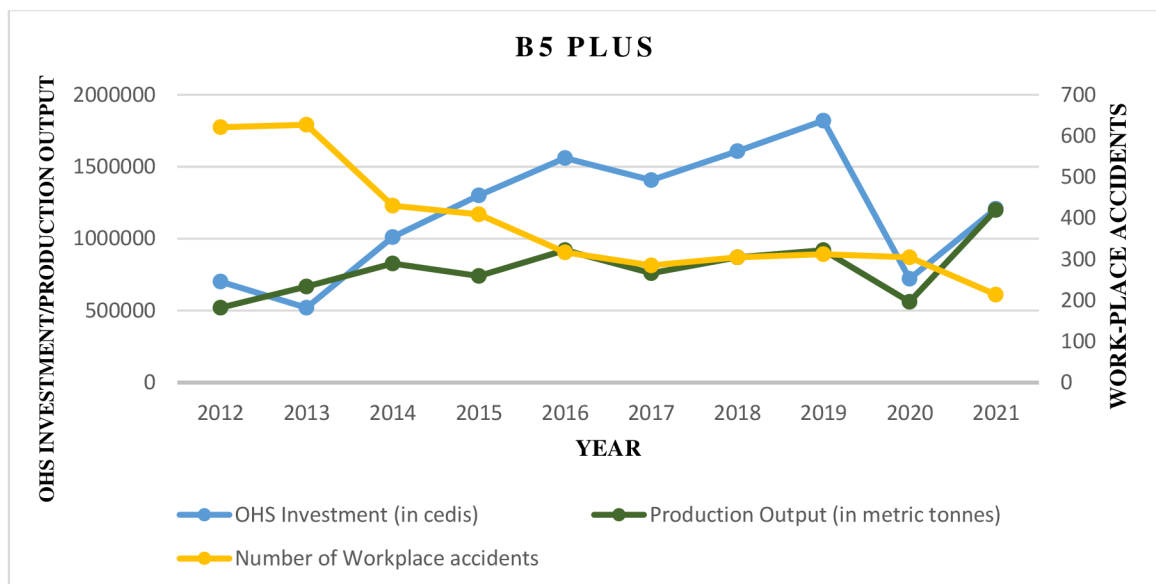
in place to protect employees from occupational hazards, they feel safe and motivated to give out their best to ensure high productivity in the company.

#### 4.4. Occupational Health System (OHS) Investment and Production Output

To further examine the effects of OHS on employees’ productivity, data was also collected on occupational health and safety investment (in cedis), number of accidents recorded at B5 Plus and total production (in metric tonnes) for ten (10) years from 2012 to 2021.

The idea was to find out whether or not OHS investment and workplace accidents predict total production output recorded in each year. The secondary data from B5 Plus showed that the highest annual investment in OHS was in 2019 (1,206,920.62 cedis) while the lowest investment was 520,000 which was for 2013. As in Figure 3 below, for the workplace accidents, the biggest number of accidents (627) recorded in a single year was for 2013 while 2021 recorded the lowest accidents (217) at the company. 2012 recorded the lowest number of metric tonnes produced by B5 over the 10-year period under study while the most productive year was 2021 which saw the highest metric tonnes of steel produced (1,200,000).

**Figure 3:** Combo chart of annual records of OHS investment, workplace accidents and production output from records of B5 Plus (2012-2021)



Source: B5 Plus (2023)

Figure 3 gives a graphical presentation which shows year-by-year changes in amounts in cedis invested into OSH management systems as well as oscillations in both the recorded annual number of accidents and production output at B5 Plus. Using the data from B5 Plus as presented in Figure 3 above, a regression analysis was conducted to test the relationship between the variables. The analysis tested the effect of investments in OHS (in cedis) and workplace accidents as independent variables on production output at B5 Plus. The results of the regression analysis are presented in Table 10 which follows:

**Table 10: Coefficient Table Iteration 1 (adjusted R-squared =0.32) for Investment in OHS, Workplace accidents and total production (in metric tonnes)**

Model	Coeff	SE	t-stat	Stand Coeff	p-value
B	7.936634	2.607253	3.04406	0	0.0187394
OHS Investment (in cedis)	0.40699	0.167477	2.43012	0.0683502	0.0454125
Workplace accidents	-0.00630161	0.13369	-0.0471361	-0.0132576	0.0284046

a. Dependent Variable: Total Production

b. Predictors: (Constant), OHS Investment, Workplace accidents

Source: SPSS Generated from records of B5 Plus (2023)

From Table 10 above, it can be deduced that there is a positive effect of occupational health and safety investment on workplace accident and consequently on total production (in metric tonnes). Investment in Occupational health and safety has a significant positive effect on total production since it has a p-value (0.0454125) less than 0.05. This means investment in OHS affect total production, that is, where management invest more in OHS, workers will feel safe to work which will consequently increase productivity. Workplace accidents also has significant effect on total production (employees' productivity) as it has a p-value (0.0284046) less than 0.05.

#### **4.5. The extent of the influence of OHS Management Systems on Productivity**

Having found a significant positive relationship between OHS management systems and productivity, it is worth assessing any motivation from appreciation of OHS systems as well as the productivity loss due to absenteeism and presenteeism. OHS management systems may not be available or may be ineffective. The survey revealed that communication on safety and health issues was not regular and clear enough, PPEs were not sufficient and management valued

productivity over employee safety. In such a situation, workers will be exposed to hazards, accidents will occur and injuries, illnesses and deaths will follow and absenteeism and presenteeism are likely to happen. Thus, assessing any productivity loss due to absenteeism and presenteeism can help understand the extent of the company's issues and to identify areas where improvements can be made. This information can help develop targeted interventions to improve employee well-being and productivity. This section uses descriptive statistics and the lost wages method to estimate productivity loss due to work-related ill health.

**Table 11: Extent to which OHS management systems influence the productivity of workers**

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
<b>Motivation due to OHS</b>					
Q17. I am satisfied with the steps Management has taken to make me safe	33 (11%)	142 (47.5%)	72 (24.1%)	45 (15.1%)	7 (2.3%)
Q18. I put in less effort at work because I am not satisfied with unsafe conditions at my workplace	39 (13%)	106 (35.5%)	519 (17.1)	69 (23.1%)	34 (11.4%)
Q19. If Management invest more in safety and health systems, it will motivate me to do more at work	79 (26.5%)	132 (44.3%)	44 (14.8%)	29 (9.7%)	14 (4.7%)
<b>Work-related illnesses</b>					
Q20. In the past year, I have suffered from an illness and disability or other physical or mental problem that was caused or made worse by unsafe conditions at work.	35 (11.8%)	117 (39.4%)	46 (15.5%)	67 (22.6%)	32 (10.8%)
<b>Absenteeism</b>					
Q21. Whenever I am sick (mentally or physically) or injured, I come to work late / leave early / leave during working hours to get treated	43 (14.4%)	137 (46%)	56 (18.8%)	42 (14.1%)	20 (6.7%)
<b>Presenteeism</b>					
Q23. My performance reduces when I come to work even when while having a physical or mental problem caused or worsened by my work.	57 (17.8%)	129 (43.3%)	66 (22.1%)	37 (12.4%)	13 (4.4%)

Source: Field Data (2023)



### **a. Motivation due to OHS**

It must be noted that motivation is often noted to be able to predict the performance and productivity of workers. Questions 17-19 of the questionnaire as seen in Table 9 above attempted to assess motivation that could be related to workers' appreciation of perceived management support for OHS at B5 Plus. In response, over half of the respondents (58.5%) indicated that they were satisfied with the steps Management had taken to make workers to feel safe. Among the other half, 24% of them remained neutral while 17.4% indicated that they were not satisfied.

The study sought to find out if workers put in less work whenever they are unsatisfied with unsafe conditions at the workplace. 145 (48.5%) of the respondents affirmed this, noting that they put in less effort when they consider the working conditions unsafe. On this, 103 (34.5%) disagreed with this stance while 17% chose the neutral stance. This suggests that in some cases, while for some workers, their performance is unaffected or not decreased by unsafe conditions, most workers will consider unsafe conditions as a symptom of less or a lack of Management support for their health and safety and thus, in a form of social exchange, they will also not work optimally in furtherance of organizational goals.

To further establish this, the next question asked if workers will be motivated to do more at work if Management improved its investments in OHS management systems. Only 43(14.4%) of the 299 workers indicated that higher investments will not motivate better performance from them. A large majority of the workers in the survey (70.8%) indicated that higher investments will make them put in more effort to work more.

### **b. Work-related illnesses**

It is well established that sick and unhealthy workers are unable to have optimum performance in any organization. Questions 20-19 of the questionnaire attempted to investigate the incidence of work-related health predicaments as well as the rates of absenteeism and presenteeism. From the survey, about half of the respondents (51.2%) in the past year had suffered a work-related illness, disability, physical or mental health problem. Only 33.4 % indicated they had had no work-related health problem. While the study did not focus on which kinds of illness or how long they had suffered or were suffering them, the study attempted to interrogate how many hours were lost (absenteeism) and how the performances of workers were affected (presenteeism) due to health problems.

**c. Absenteeism**

Question 22 was an open-ended question. It asked respondents to indicate how many hours of work they missed in the past month (28 days), because of a physical or mental problem that was caused or made worse by your unsafe conditions at their workplace. This was to assess absenteeism in the company.

**Table 12 Summary of Statistics for Hours Missed at B5 Plus in past month**

COUNT		Mean	Standard Dev	Mode	Minimum	Maximum	Sum
299	Reported Hours missed	14.79	23.6579	10	0	168	4422

Source: SPSS generated (2023) based on survey

Putting aside some invalid responses, the hours missed from work due to work-related illness or injury (ie. missing a whole day, being late, leaving early or leaving during work hours to go and get treated etc) as reported by respondents amounted cumulatively to 4422 hours (Table 10). As seen in Table 10 above, the average or mean number of hours missed was 14.78 hours. This means that on average each of the workers missed almost 14.79 hours in the past month. The minimum or lowest number missed was 0 while the highest number of hours missed was 168 hours. To calculate the productivity loss due to absenteeism, the percentage of hours lost must be generated using the formula below:

$$\frac{\text{reported hours missed due to absenteeism}}{\text{total hours expected (24 working days)} \times 299} \times 100\%$$

$$\frac{4422}{(24 \times 299) = 57408} \times 100\% = 7.7\% \text{ (Of total hours lost in the past month)}$$

In the next stage, using the lost wages method, the hours missed in the last month was multiplied by the total monthly wage for 299 workers to obtain a monetary estimation of how much lost time or absenteeism costs the steel company, B5 Plus. The formula used was:

$$(\% \text{ of hours missed} \times (\text{average monthly wage} \times 299))$$

Thus, it results in:

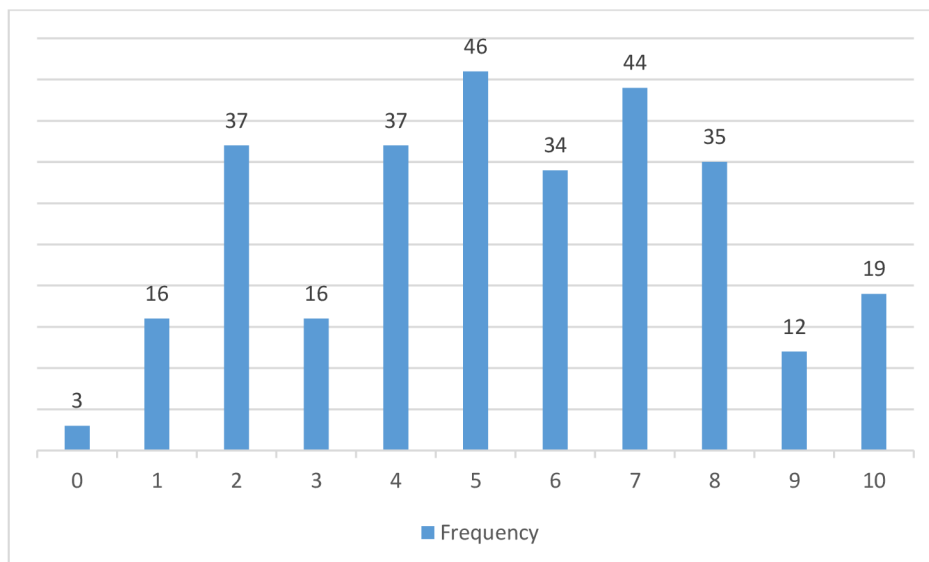
$$(7.7\% \text{ of } \times 909,857(\text{in cedis}) = 70,058.989 (\text{in cedis})$$

From the calculation, an estimated 70,058.989 (in cedis) was lost in the past month due to self-reported absences by workers. This monthly estimated amount loss due to lost time(absenteeism) when extrapolated to a year will give us an estimated annual loss of 840,708 cedis. That means that about if we take the 7.7% absentee rate as constant per every 299 workers throughout the year, the company is bound to lose about 840,000 in cedis as wages to workers for no performance at work due to absenteeism.

#### d. Presenteeism

To examine presenteeism in the company, Question 24 asked respondents to take 10 as the usual performance and then to indicate any reduced performance due to being at work while carrying a physical or mental problem that was caused or made worse by your unsafe conditions at their workplace. Rating 0 (zero) will mean “no performance at all”. Rating 1-9 will mean a reduction while rating 10 will mean no reduction in performance. Figure 4 below shows the various responses given by respondents.

**Figure 4:** Ratings of changes in performance due to work-related ill-health



Source: Fieldwork (2023)

From Figure 4 above, 3 workers picked 0 as their rating, meaning that they had no performance at all while present at work due to ill-health. In all, apart from the 19 workers who chose rating 10, all the other workers indicated that they experienced a reduction in performance when they reported to work but were unwell. Majority (46) of the workers indicated that their performance dropped to a rating of 5 on days they are present at work while unwell or injured.

Table 13 below reveal that among the responses, the average rating in the specified range from 0-10 was 5.37 with 5 being the most frequently occurring rating. The maximum or highest rating was 10 while the lowest was 0. Overall, the cumulative of all rating was 1606.

**Table 13: Summary of Statistics for Reported Changes in Performance**

COUNT		Mean	Standard Dev	Mode	Minimum	Maximum	Sum
299	Reported changes in performance	5.37	2.5355	5	0	10	1606

Source: SPSS generated (2023) based on survey

In order to assess the percentage rate of the changes or reduction to performance due to work-related ill-health, we subtract the mean (average reported mark) from the highest rating (10) and calculate what it amounts to in percentages.

The formula,  $(10 - \text{mean rating}) \times 100\%$  is used. Thus, when calculated, total performance lost due to ill-health is calculated as:

$$\frac{(10 - 5.37)}{10} \times 100\% = 46.3\%$$

The percentage of performance lost in the past month before the current study is 46.3%. That means that almost 50% of the workers performance was lost due to being ill while present at work. To further calculate productivity loss over the past month due to absenteeism, we use an adapted formula for the lost wages' method similar to Mitchell and Bates (2011) as shown below:

$$\% \text{ of reported lost performance} \times (\text{average monthly wage} \times 299)$$

Thus, amount loss due to presenteeism will be calculated as follows:

$$46.3\% \times 909,857 \text{ (cedis)} = 421,263.791 \text{ (cedis)}$$

This calculated monthly estimated amount loss due to reduced performance (presenteeism) when extrapolated to a year will give us an estimated annual loss of 5, 055, 166 cedis. That means that about if we take the presenteeism rate as constant per every 299 workers throughout the year, the company will incur an annual loss of about 5 million in cedis as wages to workers for reduced or sub-optimal performance at work due to ill-health. The productivity lost due to presenteeism is about 6 times more than losses due to absenteeism.

## **5. Results and Discussion**

This section deals with the presentation and discussion of the major findings that emerged from the study. In the discussion of the results from the questionnaires, findings from the qualitative data analysis done in the previous section will be used in the embedded design to supplement and strengthen the interpretations made. The findings of the study are organized and discussed in accordance with each research question.

The participants of the survey were mainly males. This means more male employees took part in the study than females. This is in keeping with the typical male dominance in the metal manufacturing industry. Majority of the respondents were young people between the ages of 21 to 30 years hold senior high school certificate and who have mainly worked at B5 for up to 10 years. They were constituted mainly of full-time permanent as well as contract workers. The representation was spread across the different departments at B5 Plus with the administrative department, Transport, Fabrication and Civil departments being the most represented.

### **5.3.1 Research Question One: What are the causes of accidents and risks in the working environment of B5 Plus Steel Manufacturing Company?**

Research question one sought to determine the causes of accidents and risks in the working environment of the B5 Plus. The results of the study showed that most of the causes of injuries and diseases at B5 Plus is as a result of manually lifting of heavy objects whereas the least cause is experience of sexual violence. All the top causes which are manually lifting of heavy objects, doing repetitive movements for long, uncomfortable work posture, standing for too long are ergonomic hazards. This finding is similar to the findings of Bristot et al. (2020) who suggests that ergonomic hazards are the biggest contributor to ill-health at a company they studied. They found lack of space or confined spaces which is also an ergonomic hazard is the biggest factor behind accidents. Similarly, Tendai and Jerie (2017) also realize the danger in these hazards, noting that in most workplaces including steel factories, many workers report developing musculoskeletal disorders especially back pain and other injuries. The prevalence of ergonomics could be due to two reasons: ergonomic hazards are present in all work settings. While other forms of hazards like biological, digital and certain types of physical hazards may be specific to conditions in only a particular working environment, ergonomic problems like with work design, work scheduling among others can affect workers in every workplace.

It is also noted that there was a mention of sexual violence against women. While the number of respondents who cited these may not be as high as other hazards, it is still critical to pay attention to them. On the issue of sexual violence against women, female workers have been found to be prone to unique gender-based violence due to their gender in industries which are largely male-dominated.

### **5.3.2. Research Question Two: What are the various occupational safety and health management systems in the B5 Plus Steel Manufacturing Company?**

Research question two also sought to identify the various occupational safety and health systems at B5 Plus. The results of the study showed that that employees of B5 Plus are given the necessary training on health and safety issues before they start a job, change jobs or use new techniques. Communication between employees and management about safety issues is however irregular and not clear enough for employees. Majority of respondents indicated that there are systems are put in place to identify, prevent and deal with hazards at work.

Workers indicated that workplace health and safety is not seen to be as important as productivity and quality service. The study implies that management of B5 Plus do not pay much attention to workplace health and safety issues as they do to productivity and quality service. This is in line with Bentil's (2018) conclusion that managers in Third World countries, as Ghana is, do not pay the needed attention to OHS. In most cases, they prioritize productivity over the safety and health of their employees. It is also in consonance with the observation Ivancevich (2015) makes that business managers in Africa are willing to overlook unsafe work conditions in pursuit of productivity and profits. Overall, this finding could suggest that to the workers of B5 Plus, management support for safety was not as expected.

Furthermore, B5 Plus has in place an active and effective health and safety committee and/or worker health and safety rep. This revelation is most likely testament to the existence and work of the Safety Department and the Safety Officer. From the interviews, it was revealed that he and his department in tandem with the Production Manager were the two main people responsible for ensuring safe practices among working employees.

The results also revealed that when accidents and incidents occur at the workplace, there is quick investigation into it to ensure that immediate response is provided to combat it. Again, it is likely

this is one of the functions of the Safety Department and the Safety officer. The interview with the Safety officer confirmed that accidents still occur at B5 Plus, despite the huge investments made by Management. As part of his work, he records and looks into any accidents that occur.

Communication about workplace health and safety procedures is not done in a way that they can understand. This means that while communication about work place is done at B5 Plus, it is not clear and comprehensible enough for the workers. From the interactions with the Management Heads during the interviews, it was observed that all Management Heads were Indians. It must be noted that B5 Plus as a company was established by Mr. Mukesh Thakwani, an Indian business man. The Management members as Indians share only English as a common language with the workers of B5 Plus who are mostly Ghanaians. Thus, problems are bound to occur when workplace health and safety procedures are communicated in English Language. Considering also the fact that majority of the workers have low educational background and may not be very competent at grasping concepts communicated in spoken or written English, workers may end up committing mistakes which may eventually lead to near-misses, actual accidents or even death due to communication gaps with members of Management.

With Personal Protective equipment (PPE's), it is necessary for all workers to have them while working. Where a hazard cannot be totally eliminated, risks are reduced by controls such as the wearing of personal protective equipment. During the survey, it was discovered that majority of the respondents agree that all required Protective equipment (PPEs) are available to them when working. That notwithstanding, a good number of respondents were either neutral on this or disagreed, saying that PPEs were not always available to them while working. This revelation is corroborated by the interview with the Safety Officer. In the interview with him, he stated that though Management of B5 Plus is unable to provide protective clothing for all the workers because of budgetary constraints. This lack of PPEs, together with non-compliance with safety protocols, is the main reasons for the frequent incidence of accidents at the workplace.

Finally, another system in place to manage the health and safety of workers at B5 Plus is that emergency response measures like first-aid kits, fire extinguishers and emergency exits are provided for such incidents when they are required. In a nutshell, results from the analysis indicate that the occupational safety and health systems available at B5 Plus include training of employees on workplace health and safety issues, putting systems in place to identify, prevent and deal with



hazards at work, instituting active and effective health and safety committee and/or worker health and safety rep, quick investigation of accidents and incidents at workplace, provision of all required Protective equipment (PPEs) to workers when working and providing first aid kits, fire extinguishers and emergency exits etc. Relating these findings to previous studies, the researcher can conclude that, just like the management of iron, steel and metal manufacturing industries in Ethiopia was committed to improving OHS (Berhan, 2020), management of B5 Plus Steel Manufacturing Company are partially committed in such regard.

This commitment is shown from the Management support for OHS. From the interview, it was realized Management understand the risky nature of steel manufacturing and thus they put a lot of money into it. Despite this, as the interviews reveal, since workplace accidents still occur almost every day, there was a need to do more practically and especially financially.

### **5.3.3 Research Question Three: To what extent does occupational safety and health influence the productivity of workers at the B5 Plus Steel Manufacturing Company?**

In order to assess the effect of occupational safety and health systems on the productivity of workers, regression analysis was employed. The analysis showed occupational health and safety systems, when available and effective, can dependably forecast workers' productivity. In other words, where occupational safety and health systems are made available to workers, their performance and productivity level is likely to increase.

The regression equation suggests that a unit improvement in workplace health and safety training received when starting a job, changing jobs or using new techniques will result in -0.323-unit decrease in productivity when other occupational safety and health systems variables remain constant. This is statistically insignificant as the P-value of 0.252 is greater than 0.05. Also, a unit improvement in communication on safety issues between employees and management will result in 0.120 increase in productivity which is statistically insignificant P-value 0.710 is greater than 0.05.

Regression analysis shows that, when emergency response measures like provision of first-aid kits and emergency exits are provided (Sig. 0.011), when communication about work place health and safety procedures is communicated in a way that workers can understand and (0.02), when all required Protective equipment (PPE's) are available when working (0.034) and when systems are in place to deal with hazards (0.036), workers' productivity will also increase. This is because the

aforementioned occupational safety and health systems have significant values between 0.01 to 0.05 as seen in Table 7, indicating that they have significant effects on workers' productivity. Safety training in this specific study however seemed to have a negative effect on productivity. That notwithstanding, its effect was seen as insignificant. For other occupational safety and health systems analysed in this study, they were found to be insignificant, they have positive (greater) impact on workers' productivity anyways.

From the interviews with the Heads of Management who were interviewed, it was discovered that the positive significant effect OHS management systems has been felt experientially by Management members. They explain that OHS management systems give workers security, a positive feeling, allowing them to work better freely and without fear. While no explicit mention was made of motivation in the responses, the above summarized responses are similar to terms prevalent in the literature on motivation. Several studies use similar descriptions to conceptualize OHS management can be a source of motivation that leads to higher performance and productivity (Koopman, 2014; Bawa, 2017; Nkrumah et al., 2021).

The overall findings of the present study confirm the findings of Badekale (2012) which found out that, there is a positive link between OHS policies and the performance of employees in Larfage (WAPCO) Ewekoro, Ogun State in Nigeria. Again, the findings from the study are in line with the findings of Amponsah-Tawiah and Mensah (2016) and Nyoh (2015) who all concluded that occupational safety and health systems have an influence on employees' performance. Again, like the present study, Jelimo (2013) and Ayu et al. (2021) discover a significant positive effect of occupational health and safety systems and culture respectively on productivity. However, the present study contradicts the findings of Dwomoh et al. (2013) which found a weak correlation between OHS policies and employees' performance.

Altogether, the analysis of data confirms that when systems are put in place to protect employees from occupational hazards, they feel safe and motivated to give out their best to ensure high productivity in the company. Riedel et al. (2001) affirm that occupational health and safety management systems better the job climate and relations in the organization which in turn motivates employees to improve their performance. ILO (2015) also avers that employers invest very little or nothing in health and safety systems, which leads to more accidents, near-misses and injuries. This situation, according to the organization, ultimately leads to less productivity.

O'Donnell (2000) adds that increased productivity and profitability will also help the organization to make more investments to significantly improve the safety and health conditions at the workplace.

Regression analysis was used again to find out if occupational health and safety investment and workplace accidents could total output recorded in each year. The analysis used records of the occupational health and safety investment, number of accidents and total production output in metric tonnes at B5 Plus from 2012 to 2021. From the analysis, a significant positive effect of occupational health and safety investment on workplace accidents and consequently on the total metric tonnes of steel produced each year. Investment in Occupational health and safety has a significant positive effect on total production. This means investment in OHS affects total production, that is, where management invests more in OHS, workers will feel safe to work which will consequently increase productivity. Workplace accidents also have a significant positive relationship with total production output. The respondents through the questionnaire confirm this same relationship when they note that they will be motivated to work better whenever Management increases their investment in OHS. This confirms the social exchange theory which posits that workers and the organization exist in a “give-and-take” relationship where they interpreting an organization’s investments in occupational safety and health as benefits to them, and then reciprocate by performing better and increasing productivity as a benefit to the organization (Turunç & Çelik, 2010; Molm, 2014). The interview with the Finance Officer corroborates this fact. He notes that the company’s productivity had indeed began to see an increase since the company improved its investments in OHS. In general, this finding agrees with what Bwengye (2021) found. He discovered that in a steel manufacturing company in Uganda, investments in OHS helped the organization as it reduced absences, boosted the morale of workers and improved both the quality and quantity of work produced at the plant.

The study also examined the extent to which OHS Management Systems affects productivity focusing specifically on motivation and the value of productivity loss or gain due to motivation, absenteeism and presenteeism. Where OHS management systems are not available or are ineffective for some reason, lack of motivation, absenteeism and presenteeism are likely to be prevalent due to the high incidence of accidents, injury and illness. From the survey results, it was found that OHS management systems at B5 Plus in place may not be functioning as they should.

Specifically, it was realized that communication on safety and health issues was not regular and clear enough, PPEs are not sufficient for everyone and management valued productivity over the safety of workers. The interviews add that beside the insufficiency of PPEs, non-compliance to safety protocols which occurs at B5 Plus renders OHS management systems, if available, to be ineffective.

From the questionnaires, most of the employees were satisfied with the steps Management had taken to make them feel safe. The study showed that in some cases, while for some workers, their performance is unaffected or not decreased by unsafe conditions, most workers put in less work whenever they are unsatisfied with unsafe conditions at the workplace. Per the social exchange theory, workers will consider unsafe conditions as a symptom of less or a lack of Management support for their health and safety and thus, in a form of social exchange, they will also not work optimally in furtherance of organizational goals. Workers will be motivated to do more at work if Management improved its investments in OHS management systems. Nkrumah et al. (2021:7) also notes that effective OHS systems give employees the “interest, willingness and dedication to work”. Again, Abraham Maslow’s theory of needs posits that people’s actions are driven by five main needs in a hierarchy. In this hierarchy, lower needs like safety need to be fulfilled before higher needs like esteem and self-actualization which relates with career pursuit and job performance.

Half of the employees who participated in the survey have experienced a work-related illness, disability, physical or mental health problem in the past year. This accentuates the perilous nature of work in a steel manufacturing company while also putting to question the effectiveness of the OHS management systems at B5 Plus. The problems of non-availability of certain systems as well as the factors behind the ineffectiveness of the available systems have been examined already. From the interviews, it was seen that sick or injured workers will often absent themselves from work or miss some workers off work. Even when they are present, the workers will often be unable to work optimally. Absenteeism persists at B5 Plus and Management has come to terms with it because they understand the toll the risky nature of the job can have on workers. The interview with the Management and the reported rates of absentees in this study confirm the findings of Bristot et al. (2020) that absences continue since accident rates can still escalate despite the presence of OHS management systems. This is because workers may engage in unsafe acts due to

their own recklessness, malpractice or negligence. Again, from the interviews, despite efforts to compensate for absent workers by getting the other workers to take up their burden, the company usually falls short of its production targets due to continuing absenteeism.

In all, 7.7% of the past month's expected hours were lost because workers either missed a whole day, were late, left work early or left the workplace during working hours to go and get treated. Similar to the present study, Krishnamurthy et al. (2017) in their study on a steel plant in Southern India concludes that because of a lack of an effective system to deal with heat stress workers will often report sick and miss hours of works. The lost wages method used made it clear that, due to absenteeism, B5 Plus is losing an estimated 70,058.989 cedis every month and loss of 840,708 cedis per annum per every 299 workers. In all, the finding of this research is consistent with findings of the SHRM (2014) who concludes that the absenteeism of a particular worker can reduce the productivity other employees, supervisors and, in effect, the organization in its entirety.

Presenteeism on the other hand was leading to a 46.3% reduction in performance as employers who are present-but-sick, or injured were revealed to have had reduced performances while working in the company. Presenteeism was costing the company productivity loss estimated at a monthly amount of 421,263.791 (cedis) and by extrapolation, an annual figure of 5,055,166 cedis. That means that about if we take the presenteeism rate as constant per every 299 workers throughout the year, the company will incur an annual loss of about 5 million in cedis as wages to workers for reduced or sub-optimal performance at work due to ill-health. The productivity lost due to presenteeism is about 6 times more than losses due to absenteeism. This finding is similar to Hemp (2004) and Dow Chemical as cited in HESAPRO (2013) who both found that productivity loss due to presenteeism far outweighs losses associated with presenteeism. More precisely, the difference in presenteeism and absenteeism is close to the discovery Hemp (2004) made in his study that presenteeism amounted to 7.5 times more losses than absenteeism in terms of productivity.

## 6. Conclusion

Three major objectives were focused on in this study. The first research objective investigated the various hazards and risks in the working environment of B5 Plus Steel Manufacturing Company. The second objective also sought to identify the presence of occupational health management systems set up at the steel company while the third objective sought to assess the effect of occupational safety and health management systems on the productivity of workers of the B5 Plus Steel Manufacturing Company. Qualitative data collected through interviews with 5 members of top management at the company was analysed to supplement the main quantitative data gathered from a sample of 299 workers from the headquarters of B5 Plus at Tema in Accra, Ghana. Content analysis of interviews were combined with descriptive analysis and regression analysis of data from questionnaires were used to arrive at the following key findings as summarized below:

- i. The study found that the ergonomic hazards and physical hazards were the major cause of ill-health and injury at B5 Plus Steel Manufacturing Company. The study revealed that most respondents attributed workplace health problems to hazards inherent in work design, routines and processes.
- ii. Results from the analysis indicate that B5 Plus does well to provide OHS management systems such as safety training of employees, systems for managing risks, a committee and representative for worker health and safety rep, as well as timely investigation of workplace accidents. The company also provides adequate interventions that workers can make use of in times of accidents and emergencies like fires.
- iii. Communication about OHS however needs to be worked on so that it can be clear enough and regular for workers. This will go a long way to improve the overall efficiency of all the systems put in place.
- iv. In terms of the provision of all required Protective equipment (PPEs), while a lot has been done, there is more room to improve so that every employee can have access.
- v. The study found a positive significant effect of most occupational health and safety systems at B5 Plus on workers' productivity. Specifically, putting systems in place to identify, prevent and deal with hazards at work, instituting active and effective health and safety committee and/or worker health and safety rep, quick investigation of accidents and incidents at workplace, provision of all required personal protective

- equipment (PPE's) to workers when working and providing first aid kits, fire extinguishers and emergency exits among others had a significant effect on worker productivity. Although other systems did not have significant relationship to productivity, most still have a positive relationship to productivity except for safety training which showed a negative relationship albeit insignificant effect.
- vi. Investments into occupational health and safety have a positive significant relationship with production output of B5 Plus. This means that higher investments mostly led to increases in the recorded metric tonnes of steel produced.
  - vii. Non-compliance of employees leads to the ineffectiveness of occupational health and safety systems in protecting workers from accidents, illness and injuries
  - viii. Due to the continuing incidence of work-related accidents and diseases among workers, absenteeism and presenteeism were recorded at B5 Plus. There was significant productivity loss due to absenteeism and even higher losses due to presenteeism. This means that due to work-related diseases and injuries, productivity was lost due to no performance when hours were missed and reduced performance when workers worked while unwell.
  - ix. Losses due to presenteeism is always greater than losses due to absenteeism. This means that it is very important to pay attention to how workers performance decreases when they come to work while sick or injured.

### **Recommendations of the Study**

The findings from the study could have practical, policy and theoretical implications. This section discusses the recommendations based on the findings of the present study.

The practical implications of the findings from the study will be useful to, specifically B5 Plus Steel Manufacturing Company and other similar organizations. The author recommends that:

- i. First of all, the company should respond to ergonomic concerns at the workplace. Problems like manual handling of heavy objects, repetitive movements and too much workload can be dealt with by increased mechanization, and better scheduling of work. The company could establish a shift system to decrease the workload of workers.
- ii. In a male-dominated workplace like B5 Plus, measures should be taken to better protect the few female employees from sexual violence of any kind.

- iii. Strategies by the company should focus on improving communication about health and safety issues. Communication should be regular and clear. For this, it will be important to delegate powers to native workers who can connect better to employees and communicate more frequently with other workers in clear and relatable language about safety and health issues. This is likely to improve compliance and the effectiveness of all other OHS management systems.
- iv. The current study has showed that compliance is key to the effective running of all occupational health and safety systems. The company should therefore focus on strategies that incentivize compliance to safety rules and regulations. Improving compliance will improve safety culture and reduce the exposure of workers to hazards, thereby reducing the incidence of absenteeism and presenteeism due to ill-health and injury.
- v. The current study has again showed that increased investment in occupational health and safety management systems lead to better performance and production output. More budgetary allocation for OHS can reduce even more the rate of accidents, and illness at B5 Plus which will in turn decrease productivity lost due to presenteeism and absenteeism
- vi. Finally, companies are usually more focused on reducing absenteeism but this study shows that presenteeism costs companies even more productivity losses. It is important to encourage workers to report illnesses and injuries in order to get medical treatment so they can return to work healthy and productive since forcing sick or injured workers to come to work may not be as beneficial as organizations may have thought.

### **Policy Recommendations**

The author of the diploma thesis presents some policy recommendations based on its findings:

- i. At the national level, a more comprehensive policy should be created to govern the implementation of OHS management systems at various work settings.
- ii. Beyond policy creation, there must be effective implementation and monitoring of the health and safety management of companies. Incentives and sanctions should then be



created to reward compliance and punish non-compliance among businesses on the national level.

### **Suggestions for Future Research**

The findings from this study make significant empirical contribution to the relationship between occupational health and safety management and employee performance and productivity. Based on the findings from the present study, the subsequent suggestions can be used to guide future research:

- i. Future studies could focus on compliance and safety culture among workers in the steel manufacturing companies in Ghana, delving deeper into the internal and external factors behind risky behaviours. This will provide sufficient information to tailor behaviour change projects that can enhance compliance among workers.
- ii. Future economic evaluations can be undertaken to determine other costs, beside productivity losses, to organization due to workplace accident, injury and illness.

All in all, it is true that the steel manufacturing industry is rife with all kinds of hazards. This study has shown that at B5 Plus Steel Manufacturing Company, diseases and injuries to employees are mainly caused by ergonomic, physical, and chemical hazards. The current study has provided empirical evidence in support of the view that occupational health and safety management systems affect employee performance and productivity. Effective occupational health and safety management systems increase worker motivation, reduces absences and minimizes the incident of presenteeism. This means that where they are both present and also functional, they are able to produce motivated, and healthy workers who contribute satisfactorily to the bottom-line of organizations.

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**c. List of abbreviations**

ILO	International Labour Organization
OSH	Occupational Safety and Health
OHSMS	Occupational Health and Safety Management Systems
OHSAS	Occupational Health and Safety Assessment Series
WHO	World Health Organization

## 9. APPENDICES

### 9.1 Appendix A: Questionnaire for Employees of *B5 Plus*

Dear Sir/Madam,

This study is on the topic: “The Impact of Occupational Health and Safety Management Systems on Employee Performance: The Case of the B5 Plus Steel Manufacturing Company”.

Please, be assured that the solicited information will be used solely for academic purposes and would be treated with the utmost confidentiality.

#### Section A: Background Information of Respondents

Please tick  appropriately

1. Gender: Male  Female  If others (specify).....
2. Age: 21-30 years  31-40years  41-50years  50 years and above
3. How long have you worked in this company  
0 – 10 years  11 – 20 years  21 – 30 years  31 years and above
4. Is your job ...  
Permanent full-time   
Permanent part-time   
Contract/casual
5. Education qualification  
JHS  SHS  Degree  Postgraduate degree   
Vocational qualifications
6. Department  
Management  smelting  Administrative  Cleaner, security etc

## **SECTION B: Causes of accidents and risks at the B5 Plus Limited**

Please tick [] where applicable

7. What causes injuries, and diseases at your workplace?

- Manually lifting of heavy objects
- Doing repetitive movements for long
- Uncomfortable work posture
- Stand for too long
- Too much workload
- Toxic chemicals, liquids and gases
- Confined spaces
- Slips/trips/falls
- Extreme heat
- Electrocution
- Fire or explosions
- Cuts
- Experience of sexual violence
- Experience of being bullied, or beaten

**SECTION C: Occupational Safety and Health Systems at B5 Plus Limited**

Please tick [√] where applicable

5 – Strongly agree    4 – Agree    3 – Neutral    2 – Disagree    1 – Strongly disagree

<b>At my workplace ....</b>	<b>Strongly agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly disagree</b>
8. Everyone receives the necessary workplace health and safety training when starting a job, changing jobs or using new techniques					
9. There is regular communication between employees and management about safety issues					
10. Systems are in place to identify, prevent and deal with hazards at work					
11. Workplace health and safety is considered to be at least as important as productivity and quality service					
12. There is an active and effective health and safety committee and/or worker health and safety rep					
13. Incidents and accidents are investigated quickly in order to improve workplace health and safety					
14. Communication about workplace health and safety procedures is done in a way that I can understand					
15. All required Personal Protective equipments (PPE's) are available when working					
16. Emergency measures like provision of first-aid kits and emergency exits etc are provided					

**SECTION D: Extent to which occupational safety and health influence the productivity of workers at the B5 Plus Limited?**

Please tick [✓] where applicable

5 – Strongly agree    4 – Agree    3 – Neutral    2 – Disagree    1 – Strongly disagree

At my workplace ....	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
16. I am satisfied with the steps management has taken to make me safe					
17. I put in less effort at work because I am not satisfied with unsafe conditions at my workplace					
18. Management's investment in safety and health management systems motivates me to do my best					
20. I am made to come to work even when I am suffering a physical or mental problem					
21. In the past year, I have suffered from an illness and disability or other physical or mental problem that was caused or made worse by unsafe conditions at work					
23. My performance reduces when I work even when I work while having a physical or mental problem caused or worsened by my work					
22. In the past month (28 days), I have missed ..... number of hours of work because I arrive late, leave early, went to get treated etc) because of a physical or mental problem that was caused or made worse by your unsafe conditions at your work place? 24. Taking your usual performance as 10, what is your performance on days when you go to work even while having a physical or mental problem caused or worsened by conditions at work Choose from options: 0-10					



## **9.2. Appendix B: Interview Guide (For Management)**

- Introduction of Moderator
- Assurance of Ethics: Purpose of study and Confidentiality

### **A. Bio-Data / Demographic Information**

- Can you tell me about yourself, including your (1) name, (2) age, (3) gender?

**NB: This guide was used in a semi-structured manner. It covered three main themes and some sub-topic considerations underneath them.**

### **B. Areas/Themes**

#### **Theme 1: How will you describe the quality of OHS at B5 Plus?**

Actual Level of safety at the workplace

Systems in place to ensure OHS

Investment in OHS

People involved in safety management

#### **Theme 2: To you, how important is OHS to workers?**

Perceptions of OHS

How high OHS is valued in the company

#### **Theme 3: Does OHS affect worker performance and productivity?**

Effect on satisfaction, commitment, motivation, absences etc

Effect of OHS on performance of employees

Effect of OHS on overall production output

### **C. Conclusion**

- Would you like to ask a question, make a comment, or make a suggestion based on our interaction?

**Appreciation:** On this note, I would like to express my appreciation to all of you for making time to participate in this interview.

### **9.3. Appendix C: Transcript for Interviews with Members of Management at B5 Plus**

#### **a. Interview with Safety Manager**

**Interviewer:** How will you describe the quality of OHS at B5 Plus?

**Safety Manager:** Management has been providing safety equipment and protective clothing for all the workers. But mostly not enough for everyone because of our budget constraints. We also record work-related accidents on a frequent basis due to the nature of the work. And also, some workers also fail to comply to the safety rules and regulations of the company.

**Interviewer:** How severe are some of these accidents?

**Safety Manager:** Some of the accidents are very serious which mostly result in the death of some of the employees and some even lead to the destruction of company infrastructure and for those accidents we have a compensation for those who get injuries and the compensations are also given to those who lose their lives through the company's activities.

**Interviewer:** Do you have a yearly budget for investments in OHS management systems and equipment?

**Safety Manager:** Yes. The company has a yearly budget for the safety department but not enough most often due to increasing number of work-related accidents and the compensations.

**Interviewer:** To you, how important is OHS to workers?

**Safety Manager:** Yes. It is a big deal for them. Almost every day, we record work-related accidents in almost all the production units of B5 but most of them are minor. But, some result in the death of some of the employees. It is something unfortunate. That's why OHS must be taken seriously

**Interviewer:** Does OHS affect worker performance and productivity?

**Safety Manager:** For me what matters is that workers are safe and they have to be given the tools for that. If they comply, they are safe and everyone is happy. We reduce accidents, nobody gets hurt and work goes on smoothly because everything is ok for them.

## **b. Interview with Production Manager**

**Interviewer:** How will you describe the quality of OHS at B5?

**Production Manager:** It is not too bad. A lot of money goes into it. And me together with the Safety Manager ensure that everyone entering a production unit wears protective clothing before the start of work. We do our best to make sure ensure that everybody complies because of the nature of our production we undertake.

**Interviewer:** To you, how important is OHS to workers?

**Production Manager:** Very important. The thing is workers work here for 8 hours every day from Monday to Saturday. You have to be fit and strong for that.

**Interviewer:** Does OHS affect worker performance and productivity?

**Production Manager:** We see all the time that that workers work better when they are healthy and also when they can work freely without fear on any harm coming to them.

**Interviewer:** What is done when workers who feel unwell absent themselves?

**Production Manager:** Even though absences from work have reduced because we try not to let it happen. But we get absentees with workers complaining about all sort of things. And I don't like that but that is what happens due to the nature of our work. You can't force them to come to work by force. Especially if it is a bad injury. And but you know, this is a large company so when someone is absent and gets permission from the superior.

No problem. Work continues. We mostly produce between 700, 000 to 1,000,000 metric tonnes of steel yearly. So, we try to do our best to meet our targets. But sometimes we meet them and other times, we don't. Actually, most of the time, we are unable to hit our targets. That's why we try to do more. Not just in OHS, we try to get more work done and more products to service our customers.

### **c. Interview with Finance Officer**

**Interviewer:** How will you describe the quality of OSH at B5?

**Finance Officer:** We are trying our best. We have a large budget allocation to OHS but I will say it is not enough due to the nature of the operations of the company and the number of workers we have in the various departments.

**Interviewer:** Do you consider your investments in OHS worth it? And do you think OHS management systems impact productivity?

**Finance Officer:** Yes. The investment in OHS has impact on the operations. Because without it, we will have fire outbreaks within the organization and loss of human life. Also, OHS systems have an impact on productivity because our productivity began to increase when we improved our investment in OHS.

**Interviewer:** To you, how important is OHS to workers?

**Finance Officer:** It is very important. That's why we always want to do more to protect our workers. We are always in talks with the Management Board to increase the yearly budget allocation to the safety department because they will mostly pay huge compensations to workers.

#### **d. Interview with Human Resource (HR) Manager**

**Interviewer:** How will you describe the quality of OHS at B5?

**HR Manager:** I will say OHS is very high with the organization because it is one of the key components of our operation.

**Interviewer:** How does OHS fit into your work as HR?

**HR Manager: Yes.** You have to have a very big idea about OHS before you can be very effective in such an organization. Because I see to it that everybody employed into this company is fit and sound because of the nature of our operations.

**Interviewer:** To you, how important is OHS to workers?

**HR Manager:** It is very important to workers because it turns into productivity. When workers are aware that there are proper OHS in place, the worker works freely without fear.

**Interviewer:** Are your workers satisfied with the OHS management systems put in place by Management. Please, explain your answer.

**HR Manager:** Yes. Because we invest heavily into OHS systems and also because of our productivity.

**Interviewer:** In general, does OHS have an impact on employee performance and productivity? Please, explain your answer...

**HR Manager: Yes.** Because it gives employees at all levels the sense of security of work. This has a great impact on productivity. Also, it saves the company from losses and also even the environment because some work-related accidents can lead to environment hazards.

**Interviewer:** How do you deal with compliance and non-compliance to OHS protocols here at B5?

**HR Manager:** We are very serious about compliance to safety at all levels with the organization. Failure to comply can lead to the dismissal of employees.

e. **Interview with Head of Supervision**

**Interviewer:** What are the biggest hazards your workers face in the various departments while working?

**Supervisor:** Fire outbreaks, electric shocks and heavy metals falling on them.

**Interviewer:** To you, how important is OHS to workers?

**Supervisor:** It protects them from accidents and from danger. Some worker will complain so much before they work if they don't get what they need to work. They are afraid they will be hurt or something. That is not many because here our workers are mostly men and they are fit so they can do a lot without being afraid.

**Interviewer:** In general, does OHS have an impact on productivity? Please, explain your opinion.

**Supervisor:** Yes, OHS has an impact on productivity because without the OHS system put in place by the safety department, all of us are in trouble. And also, there is a positive feeling when you know there is a safety system put in place. These will enable workers to work without fear.

Sometimes, when doing my rounds, you will some people being lazy with their work and they will tell you they are not OK or they have been injured. They are men so you can try to be hard on them but you can't force them too much to work.

#### 9.4. Appendix D: Records from B5 Plus

<b>Year</b>	<b>OHS Investment in OHS (in cedis)</b>	<b>Work-related accidents</b>	<b>Work-related Deaths</b>	<b>Expected production output (in metric tonnes of steel)</b>	<b>Actual production output (in metric tonnes of steel)</b>
2012	702000	621	24	700000	520000
2013	520000	627	17	700000	667000
2014	1010000	430	13	900000	827420
2015	1300600	409	5	900000	740000
2016	1560000	317	7	900000	920000
2017	1406721.63	285	6	1000000	760000
2018	1608427.19	305	6	1000000	870000
2019	1820624.05	312	2	1000000	920000
2020	721420	305	-	1000000	562000
2021	1206920.62	214	-	1000000	1200000