EVALUATING THE EFFECTIVENESS OF OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEMS AT ZIMBABWE ALLOYS CHROME IN REDUCING OCCUPATIONAL INCIDENCES

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APPROVAL FORM

A dissertation submitted by Thabiso Matimba to Bindura University of Science Education, department of Environmental Science in partial fulfilment of the requirements for the award of the Bachelor of Science Honours degree in Safety, Health and Environmental Management on the Evaluation of the Effectiveness of the OHSMS of ZAC in reducing occupational injuries.

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Supervisor…………………………. Date………………………

Quality

Controller…………………………. Date………………………
DEDICATIONS

This dissertation is dedicated to my family and friends.
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ABSTRACT

Most industrial performance continues to deteriorate and the question posited is whether the management systems implementation is an obscure problem affecting organizational performance? If the OHSMS are effective, then what is the source of OHS related incidences in the economic sector? What relationship is there between the organisational performance and the OHSMS? If the OHSMS are formulated, and implemented by the top management then what is the relationship between the OHSMS, organisational performance, worker participation and leadership? Can we conclude that organisational poor performance can be traced down to the ineffectiveness of the OHSMS? The study sought to explore the influence of leadership in the formulation and implementation of the system and evaluate the extent to which the system implemented reduce accidents in an occupational set up. Data was collected using questionnaires and interviews. Completely Randomised Design was used to select the respondents. An inverse relationship was found between an ineffective Occupational Health and Safety Management System and organizational performance. Demographic variables such as age, job position, experience and income significantly influenced the relationship between OHSMS and organizational performance. The study concluded that an ineffective OHSMS has a negative impact to the organizational performance as it results in lost time injuries, absenteeism, accidents, low morale and poor work relations. The study recommends proactive interventions by implementing management strategies that aim at elimination of occupational incidences so that the organization may fully achieve optimum organizational excellence.

Keywords: OHSMS; effectiveness; commitment; evaluation; organizational performance
# TABLE OF CONTENTS

APPROVAL FORM .......................................................................................................................... ii
DEDICATIONS ................................................................................................................................... iii
ACKNOWLEDGEMENTS ................................................................................................................ iv
ABSTRACT ......................................................................................................................................... v
TABLE OF CONTENTS .................................................................................................................... vi
LIST OF TABLES .............................................................................................................................. x

## CHAPTER ONE: INTRODUCTION ............................................................................................... 1

1.1 Background .............................................................................................................................. 1
1.2 Problem Statement .................................................................................................................. 3
1.3 Aim ........................................................................................................................................... 3
1.4 Objectives ............................................................................................................................... 3
1.5 Research questions ................................................................................................................ 3
1.6 Justification ............................................................................................................................ 4

## CHAPTER TWO: LITERATURE REVIEW ..................................................................................... 5

2.1 Introduction ............................................................................................................................ 5
2.2 Components of an effective Occupational Health and Safety Management Systems .... 6
   2.2.1 Planning and Implementation ......................................................................................... 8
   2.2.2 Checking and Corrective Action .................................................................................... 9
   2.2.3 Review and Continual Improvement ............................................................................. 9
   2.2.4 Top management Commitment ................................................................................... 10
2.3 Safety Performance Measurement ......................................................................................... 10
   2.3.1 Lagging Indicators ....................................................................................................... 11
   2.3.2 Positive performance indicators .................................................................................. 11
   2.3.3 Leading Key Performance Indicators ......................................................................... 11
2.4 Factors that affect the Implementation of OHSMS in Industries .................................... 12
   2.4.1 Leadership .................................................................................................................... 12
   2.4.2 Employee participation ................................................................................................. 13
2.5 Major Accident Causation Theories in Workplaces ......................................................... 13
   2.5.1 Reason’s Swiss Cheese Model ..................................................................................... 14
CHAPTER THREE: METHODOLOGY ................................................................. 18
  3.1 Introduction ....................................................................................... 18
  3.2 Description of Study Area .................................................................. 18
    3.2.1 Location ..................................................................................... 18
  3.3 Research Design ................................................................................ 19
  3.4 Target population ............................................................................... 20
  3.5 Sampling Procedure .......................................................................... 20
  3.6 Research Instruments ................................................................……… 22
    3.6.1 Questionnaires ........................................................................... 22
    3.6.2 Semi Structured Interviews ......................................................... 23
    3.6.3 Secondary Data .......................................................................... 24
  3.7 Data Collection ................................................................................... 24
  3.8 Summary ............................................................................................ 25

CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS .......................... 26
  4.1 Introduction ........................................................................................ 26
  4.2 Background and Demographic Information of the Respondents .......... 26
    4.2.1 Response Rate of the Respondent ................................................ 26
    4.2.2 Gender Composition of the Respondents ..................................... 27
    4.2.3 Marital Status ............................................................................. 28
    4.2.4 Age of the Respondents ............................................................... 28
    4.2.5 Period of employment .................................................................. 29
    4.2.5 Respondents according to employment grade and educational levels ................................................................................................................................. 29
  4.3 Causes of Accidents at Zimbabwe Alloys Chrome ................................. 32
    Communication of Organisational SHE Policy and Objectives to all workers ................................................................................................................................. 34
    4.4.1 Visible Felt Leadership (VFLS) and Planned Job Observations (PJOS) ................................................................................................................................. 35
  4.5 Worker Participation in reducing work related incidences ...................... 37
    4.5.1 Hazard Identification and Risk Assessment .................................... 37
4.5.2 Role played by leadership and worker participation in reducing workplace incidences.

4.6. Lost time injuries

4.6.1 Relationship between occupational health and safety management system and number of accidents at ZAC: Regression Analysis

OHSMS Effectiveness in OHS Related Incidences

CHAPTER FIVE: DISCUSSION

5.1 Introduction

5.2 Causes of Accidents in the Organization

5.3 OHSMS Awareness Response

5.4 Strength of implementation of OHSMS

5.4 Summary

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

6.2 Recommendations

REFERENCES LIST

APPENDICES

Appendix 1: Questionnaire for the employees

Appendix 2: Interview Guide for the top management and line managers
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Components of an Effective Management System</td>
<td>8</td>
</tr>
<tr>
<td>2.2</td>
<td>P-D-C-A Model</td>
<td>9</td>
</tr>
<tr>
<td>2.3</td>
<td>Swiss Cheese Theory</td>
<td>16</td>
</tr>
<tr>
<td>2.4</td>
<td>Domino Theory</td>
<td>17</td>
</tr>
<tr>
<td>2.5</td>
<td>Human Factor Theory</td>
<td>17</td>
</tr>
<tr>
<td>2.6</td>
<td>Bradley Curve</td>
<td>18</td>
</tr>
<tr>
<td>4.1</td>
<td>Response Rate</td>
<td>25</td>
</tr>
<tr>
<td>4.2</td>
<td>Gender</td>
<td>26</td>
</tr>
<tr>
<td>4.3</td>
<td>Marital Status</td>
<td>27</td>
</tr>
<tr>
<td>4.4</td>
<td>Period of Employment</td>
<td>28</td>
</tr>
<tr>
<td>4.5</td>
<td>Educational Level</td>
<td>29</td>
</tr>
<tr>
<td>4.6</td>
<td>Top Management Commitment</td>
<td>31</td>
</tr>
<tr>
<td>4.7</td>
<td>Training</td>
<td>32</td>
</tr>
<tr>
<td>4.8</td>
<td>Supervision</td>
<td>33</td>
</tr>
<tr>
<td>4.9</td>
<td>HIRA</td>
<td>34</td>
</tr>
<tr>
<td>4.10</td>
<td>Lost Time Injury Rate</td>
<td>34</td>
</tr>
<tr>
<td>4.11</td>
<td>OHSMS Effectiveness</td>
<td>36</td>
</tr>
</tbody>
</table>
LIST OF TABLES

Table 1 showing OHSMS strategies to be adopted by leadership 12
Table 2: Sample Treatments 21
Table 3 below shows the Sample Population 22
Table 4: The list of interviewees and reasons for interviewing them 24
Table 5: Age of the respondents from primary data 28
Table 6: Academic Qualifications * Conductions of safety audits Cross tabulation 31
Table 7: Chi-Square Tests of association between academic level of employees and conductions of safety audits 31
Table 8: Causes of Accidents and their frequency from primary data 32
Table 9: Cross tabulation of Visible Felt Leadership and period of employment 36
Table 10: shows Role played by leadership and worker participation in reducing workplace incidences 38
Table 11: Model Summary of OHSMS and number of accidents 40
Table 12: ANOVA of OHSMS and number of accidents 41
<table>
<thead>
<tr>
<th>ACRONYM</th>
<th>FULL FORM</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
</tr>
<tr>
<td>OHSAS</td>
<td>Occupational Health Safety and Management System</td>
</tr>
<tr>
<td>NIOSH</td>
<td>National Institute for Occupational Safety and Health</td>
</tr>
<tr>
<td>OHSMS</td>
<td>Occupational Health and Safety Management System</td>
</tr>
<tr>
<td>LTIFR</td>
<td>Lost Time Injury Frequency Rate</td>
</tr>
<tr>
<td>PDCA</td>
<td>Plan-Do-Check-Act</td>
</tr>
<tr>
<td>SHE</td>
<td>Safety Health and Environment</td>
</tr>
<tr>
<td>HR</td>
<td>Human Resources</td>
</tr>
<tr>
<td>OSH</td>
<td>Occupational Safety and Health</td>
</tr>
<tr>
<td>NSSA</td>
<td>National Social Security Authority</td>
</tr>
<tr>
<td>ZAC</td>
<td>Zimbabwe Alloys Chrome</td>
</tr>
<tr>
<td>ILO</td>
<td>International Labour Organisation</td>
</tr>
<tr>
<td>CRD</td>
<td>Completely Randomised Design</td>
</tr>
<tr>
<td>HIRA</td>
<td>Hazard Identification and Risk Assessment</td>
</tr>
</tbody>
</table>
CHAPTER ONE: INTRODUCTION

1.1 Background

The requirements for organisations to develop Occupational Health and Safety Management Systems grew out of the aftermath of a number of disasters, predominantly in Europe (ILO Guidelines, 2002). The Flixborough accident of 1974, that blew away the whole village after an explosion at the Nypro Ltd caprolactam production facility led to the first requirement for petrochemical companies to present a Safety Case (Robens, 1972). The Control of Industrial Major Accident Hazards legislation (CIMAH) was restricted to UK onshore facilities. The Seveso incident in 1976 resulted in the European directive, known as the Seveso directive, which has been brought up to date with the Seveso II guidelines as required by the Council Directive (Cullen, 1990). After the Piper Alpha disaster in 1987, Lord Cullen identified the requirement for systematic safety management, with the Safety Case proving that a management system was in operation and was effective. Cullen’s requirements were consistent with the previous legislation and also developed the goal-setting approach first laid out in the report of the Robens Committee that resulted in the UK Health and Safety at Work Act in 1974.

Manager et al., (2017) acknowledges that reports from a number of production industries in the world show that there is a loophole in the management systems as they fail to adequately address the causes of these injuries. Caple (2000) reveals the incidence of serious laceration injuries to the hand and arm, as well as amputations, as major OH & S concerns for the meat industry in South Australia. During 1996-1999, 29% of hand injuries in the meat industry resulted from knife cuts hence there was need to address such issues by planning and implementation of injury preventive strategies. Statistics in Canada reported over 120,000 such injuries among Canadian workers in 1991 (Armstrong, 2014). (Gallagher, 1997). The US Occupational Safety and Health Administration (OSHA) estimates that more than 70 per cent of similar injuries could have been avoided had the workers received trainings and appropriate protective equipment be used and it is the duty of the top management to provide the most appropriate controls on OHS threats (Watson, 2013).

In 1975, Dr James Ham introduced the idea of an internal responsibility system, which would require government, employers and workers to work together to improve health and safety. To implement this system, he advocated for the creation of joint labour-management health and safety committees (Hale and Hoven, 1998). This was the starting point for Joint Health & Safety Committees (JHSC) and a turning point for workers as they would now have the right
to participate in health and safety recommendations. The introduction of this ‘systems approach’ greatly advanced the understanding of effective accidents and injuries prevention interventions in organisations in the 17th as everyone in the organisation had a responsibility of ensuring that safe practises are implemented Zohar, 2011). The establishment of the occupational health and safety act in 1884 marked the beginning of safety and health climates in many industries though its initial goal was to prohibit work activities of children and women and suggested work hour restrictions for all employees (Diaz et al., 1993). However, it was extremely vague in definition and totally unenforceable. It was an establishment, but in reality, the Factory Act of 1884 did not entirely protect the worker. Employers favoured the Act as it did not clearly intend to limit production, yet made production safer or so it seemed. Eighty long years passed by with this little safe guard in place.

The ILO’s campaign for the 2017 World Day for Safety and Health at Work focuses on the critical need for countries to improve their capacity to collect and utilize reliable occupational safety and health (OSH) data that will be used for future benchmarking and analysis of trends in occupational safety and health. Globally, OHS is generally a new discipline that is still in its infancy stage, as reflected by the accident and occupational diseases statistics and the low global access to it(ILO Guidelines, 2012). Despite the high levels of occupational incidents, OHS has remained an island whose existence has always been recognized but with no concerted effort support.

Zimbabwe has adopted the occupational safety and health culture in which the right to a safe and healthy working environment is respected at all levels. The government, employers and workers actively participate in securing a safe and healthy working environment through a system of defined rights, responsibilities and duties (Gallagher, 1997). The highest priority of this system being accorded to the principle of occupational injuries and fatalities prevention through the establishment and implementation of systematic accident reduction strategies in the Hierarchy of controls (Armstrong, 2014).

OSH management systems approach has retained the attention of enterprises, governments and international organizations as a promising strategy to harmonize OSH and business requirements, and ensure more effective participation of workers in implementing injury preventive measures (ISO 45001:2018).
1.2 Problem Statement

The production of chrome at ZAC leads to the emission of metallic dust, particulate matter and hexavalent chromium which are the major hazards associated with its operations (Armstrong, 2014). Hexavalent chromium (Cr\textsuperscript{+6}) is a carcinogen and negatively impacts on plants, water sources and destroys marine life (EPA, 1998). This being the case, Cr\textsuperscript{+6} has posed as a threat to the health and safety climate of the ZAC workers and the surrounding environment as it targets the respiratory tract following inhalation exposure in humans, skin reactions prior to dermal exposures in humans, death when swallowed by fish and wilting of plants that are exposed to it (WHO, 1988).

Its processes have led to the emission of these components into the environment hence negatively impacting on the nearby water sources, crops have withered and the workers developed skin reactions and respiratory diseases (NIOSH, 2010) that can be attributed to persistent exposure to chromium (VI) and dust. Having been declared a dusty occupation, ZAC should have an effective OHSMS implemented that will introduce controls that will reduce the impacts of these hazards. This research aims at assessing the relationship between leadership and occupational incidences at ZAC (ISO 45001:2018).

1.3 Aim

To evaluate the effectiveness of OHSMS implemented by ZAC management in reducing and preventing of work related incidences.

1.4 Objectives

- To assess the relationship between leadership and accident prevention at ZAC in the past 4 years.
- To determine the elements that constitute an effective OHSMS?
- To establish the influence of leadership and worker participation in OHSMS initiatives and organizational performance

1.5 Research questions

- There is a significant relationship between OHSMS and the occurrence of OHS incidences at ZAC.
- There is no significant relationship between OHSMS and the occurrence of OHS incidences at ZAC
1.6 Justification

The research is of much benefit to production organizations at large since management commitment to OHSMS performance is widely recognized as one of the most critical elements in reducing work related incidences. Manager et al., (2017) denote that Occupational Health and Safety Management Systems (OHSMS) is based on relevant OSH criteria, standards and performance hence its implementation should be mandatory in all industries, mines and organisations to cater for the occupational incidences that can occur during operations(Sulzer-Azaroff, 2001). It aims at providing methods to assess and improve performance in the prevention of workplace incidences via the effective management of hazards and risks in the workplace (Robens, 1972) and (ISO 45001:2018). It is a logical, stepwise method to decide what needs to be done, how best to do it, progress tracking toward the established goals, stakeholder participation, evaluate how well it is done and identify areas for improvement (ISO 45001:2018).

The research will first assess the relationship between management and accident prevention and controls and see if poor management leads to the occurrence of accidents at ZAC or there are other factors that contribute to OHS incidences (Geller, 2014). It will also detail the factors that affect the implementation of OHSMS specifically at Zimbabwe Alloys Chrome in a holistic approach. The results of this study will not only benefit Zimbabwe Alloys Chrome but many other production organizations globally and it will serve as a basis for further evaluations on Occupational Health Safety and Environmental related issues.

The study recommends the unequivocal organizational management support and commitment, formulation of a safety policy and culture, implementation of an appropriate legal structure and employee training and participation as key components and reveals the relationship between the employer and the employees (Harris et al., 2017).
CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Work plays a central role in people's lives, since most workers spend at least eight hours a day in the workplace, whether it is on a plantation, in an office or factories. Therefore, work environments should be safe and healthy in order to reduce the occurrence of accidents (Shell Safety Committee, 1984). Every day workers all over the world are exposed to a multitude of health hazards, such as dust, noise, pressure vessels, vibrations and hazardous chemical substances hence there is need for the management to formulate, implement and continuously improve the overall OHSMS by introducing strategies or ways of reducing the health and safety impacts of these hazards to the workers (Weick, 2015). Occupational health issues are often given less attention than occupational safety issues because the former are generally more difficult to confront (ISO 45001:2018). However, when health is addressed, so is safety, because a healthy workplace is by definition also is a safe workplace. The converse, though, may not be true - a so-called safe workplace is not necessarily also a healthy workplace (ILO, 1993).

Occupational safety and health is a complex field calling for the intervention of multiple disciplines and the assignment of roles, responsibilities and the provision of adequate resources and compliance to OHS related legislation (Veschuur, 2002). It was initiated by the International Labour Organization to facilitate the formulation, implementation and evaluation of occupational health and safety interventions at a national level, in sectors and organizational level in all countries (Gaceri, 2015). The corresponding Zimbabwe OHS Bill transposes the national OSH policy into action and inevitably reflect its complexity.

The concept of applying OSHMS was further embodied in many OHS regulations that emphasise its relationship with work related incidences and their controls for the first time in an international standard in 2006 when the International Labour Conference of the ILO adopted a Convention concerning the “Promotional framework for occupational safety and health” (No. 187) and its accompanying Recommendation (No. 197) (ILO 1993).

OHSMS should be based on development and maintenance of a preventative safety and health culture and its application in the national level of management systems’ approach to OSH. In Zimbabwe the mining sector contributes a significant number of occupational injuries quarterly. The injury rate among mining workers significantly increased from 131/1000 workers in 1998 to 789/1000 workers in 2008 and the proportion of severe occupational injuries
in the sector increased from 18% in 2008 to 37% in 2008 (NSSA, 2008). The figure below illustrates the components to be considered in developing a suitable work environment basing on the managerial approach.

![Components for an Effective Management System](image)

**Figure 2.1: Components for an Effective Management System (Gaceri, 2015)**

2.2. Components of an effective Occupational Health and Safety Management Systems

OSH management system is an important part of business management preoccupied with the control of the associated conditions and factors that affect the safety and health of employees or other stakeholders that include visitors, contractors or any other person in the workplace. An effective OHSMS is based on the clauses of OHSAS 18001:2007, ISO 45001 and EMS 14000 though not only limited to the three as they explicitly reveal how leadership should control the occurrence of incidences in the workplace. The Deming’s cycle of continuous improvement is summarized by the Figure below and gives the basic structure of the supposed to be OHSMS of any organization. ILO Guidelines, (2002) on OSHMS lies with the basic components/elements that make up the system and these include policy formulation, planning,
implementation, evaluation and performance measure for continual improvement. In other terms it can be called the plan -do-check –act.

As illustrated by the figure above , there is clear evidence that leadership is responsible for the implementation of an effective OHSMS hence it is the responsibility of every employer to take action in providing all the necessary requirements in the establishment of a safe working environment (Watson, 2013). For one to be able to deduce the effectiveness of the existing OHSMS, there is need to look into the organisational key performance indicators, regarding SHE initiatives and these include lost time injury rates and the funds that have been channelled to curb the already occurred accidents define (Chinda, 2011). Traditionally, organisations use outcome oriented performance measurement to report on the effectiveness of OHSMS on accident prevention. Lost Time Injury Frequency Rate or workers’ compensation costs are examples of the performance indicators used (Manager et al., 2017).

Figure 2.2 The PDCA Model by ISO 45001:2018
According to NSSA (2008), the injury rate among mining workers in Zimbabwe was 131 per 1000 exposed workers per year. The rates do not show whether the mining industry has OHSMS implemented and continually improved to prevent accidents and provide a safe working environment. So, this warrants a research to provide recommendations at national level to regard OHSMS as a mandatory requirement for all highly ranked risk workplaces for example the mining and industrial sectors are significantly contributing to a high rate of occupational injuries (Armstrong, 2014).

2.2.1 Planning and Implementation

The first step is policy formulation by the management that will act as a guideline in all the processes that are to be done. ILO Convention 161 states the OH Services that should be implemented by management in reducing OHS accidents and policy formulation is its first priority. (ILO Convention 161, 1985) and (OHSAS 18001:2007). This covers all the process done in the organization as it conforms to the set objectives.

HIRA is an OHS management tool as it helps in the identification of an OHS threat and taking preventive controls before any harm is done. It is the duty of the management to ensure that these two processes are always done to avoid any health and safety claims. The persons to carry out the expected activities are supposed to be part of the risk assessment ('ISO 45001:2018) process at the same time the management shall always provide with the qualified and experienced personnel to help in the hazard identification and risk assessment processes. OHSAS 18001:2007 explores the hierarchy of controls, whereby it is the duty of the employer to put in strategies that will eliminate, substitute, administer and engineer controls pertaining to specific risks and hazard. PPE provision being the last option after attempting to implement the former. Such an organization is most likely to have a planned approach on how to eliminate the risks before an incident occurs (Sowden and Harbour, 2005). In all instances, risk assessment outcomes should be communicated to all the people who are susceptible to the consequences. On the part of legal and other requirements, the company shall identify, define and implement and communicate the most applicable legal requirements that are in line with their production activities. This phase requires resources that include qualified and skilled personnel, labor force and that will be used as inputs in trying to produce an effective OHSMS that when effectively implemented will help reduce work related incidences (Cezar-vaz and Bonow, 2012). Consultation and communication are other elements that should be considered in this phase.
2.2.2 Checking and Corrective Action

There is need for the management to ensure that periodic performance measure and monitoring are carried out such that changes are made in areas that are found to be harbors of hazards and risks. This include the checking of the legally specified requirements such as health hazard exposure limits, total dust emissions and amount of noise being emitted (Hong and Thomas, 2013). This is very critical as it plays a pivotal role in ascertaining continual improvement in reducing OHS incidences. Characteristics to be measured and monitored are likely to include:

- progress towards achievement of the set target, goals and objectives at all levels
- quantitative indicators of performance such trends and patterns of injuries and incidents, lost time fatality rates and reportable injuries and incidents, analysis of trends in the lost time injury frequency rate and related financial costs

Leading / managerial indicators of performance such as:

- participation of senior managers supporting OHS activities and clearly communicating to all the procedures, notifying on hazards as well
- setting up and reviewing of targets, goals and OH&S objectives
- inclusion of OHS in all meeting agendas
- Continuous improvement processes
- Number of non-conformity (N/C) counts found during audits
- Handling time period for N/Cs and implementation of corrective action
- Incident investigation method
- Frequency of reviews on systems of work
- Planned Job Observations (health as well as safety)
- Documentation of all of the above and the control of these documents

2.2.3 Review and Continual Improvement

Adding on to the existing OHS performance measures the organization should at least review the suitability, adequacy and effectiveness of its OHS management system (Armstrong, 2014). Any agreed improvements shall be undertaken, documented and communicated to all individuals in the organization. According to SAZ (1996) continual improvement is an approach based on the continuous evaluation of OHS performance and identifying opportunities for improvement. This entails that it is through management review meetings and system audits that the deficiencies within the system are identified and corrected through programs implementation or review of set objectives.
2.2.4 Top management Commitment

Leadership is the process of inspiring people to do their best to achieve a desired result (Armstrong, 2014). It can also be defined as the ability to persuade others willingly to behave differently. The function of team leaders is to achieve the tasks set for them with the help of the group. According to New Zealand, WorkSafe (2015), it is to a large extent that the attitude of the rank and files towards safety is a reflection of the attitude of their supervisors. Line managers should set examples not merely by telling employees but by demonstrating the seriousness of safety and health measures through their behavior.

Health and safety has not been given increasing emphasis by managers, employers, employees, trade unions, employers’ associations and other stakeholders in recent years (Kemei and Nyerere, 2016). As a result of this, the organisation shall show its commitment towards provision of safe working environment through letter of empowerment to all employees. This letter empowers all employees or contractors to exercise their right to refuse work that is unsafe.

This however remains as a challenge for the top management to provide a Safe and Health work environment for employees hence threatening production. Armstrong (2014) is of the view that health and safety policies implementation and continual improvement is achieved if the senior management reflect their commitment towards OHSMS by practising safe working behaviours and providing safe working environments for their employees, staff involvement in the health and safety process, through consultation with unions or workplace committees, ensure that employees are aware of the document and the specific contents that applies to them for example empowerment letters (Gaceri, 2015).

Commitment to SHE improvements by the top management can be demonstrated through safety meetings attendance, membership in SHE committee, active participation attaining SHE objectives, targets and programs planning and implementation (Kemei and Nyerere, 2016). Management commitment can be rendered effective if the top officials are personally involved in safety activities. Organisations where top management plays an active role in safety and health issues have consistently lower LTIFR than those whose managers are not active participants.

2.3 Safety Performance Measurement

OHS performance is measured by lagging indicators, positive performance indicators and leading indicators.
2.3.1 **Lagging Indicators**

The most commonly used indicators are the ones that measure “after the fact” information. Following an incident, statistics on injuries are recorded in order to identify the level of harm or to assess the potential for harm (including fatalities), and the immediate cause of the incident (Chinda, 2011). These indicators are called lagging (or outcomes) indicators. Lagging indicators measure the final outcomes and are tools that identify the hazard once it has manifested (Manager *et al.*, 2017). This means that the cause of the incident and the associated effects can be identified only after the incident has taken its course. Lagging indicators have grabbed all the attention as it has been driven to date by regulatory requirements.

2.3.2 **Positive performance indicators**

These refer to overall goals and objectives of OHS and can be used to measure performance. These include legal certification to ISO and OSHs standards as well as achievements of Audit trophies, NSSA safety awards and national first aid awards (Chinda, 2011).

2.3.3 **Leading Key Performance Indicators**

These are those indicators that encourage continual improvement of the occupational health and safety management system and encourage its effectiveness over time by setting feasible and attainable objectives. This means identifying those organizational aspects that pose the highest risk towards the desired OHS outcomes (Cezar-vaz and Bonow, 2012). Examples of these include peer to peer observations, inspections, visible felt leadership and planned job observation. The idea of reporting near misses and peer to peer observations indicate the actual OHS performance of a specified organization. Safety performance in Zimbabwe.

From 2004 to 2009 occupational injuries have been averaged to a basis of 648 (in quarry mining) and the average in the Basic Metal Production was 633 hence occupational injuries and safety are among the top ten health priorities in the country (NSSA Guideline, 2009). According to NSSA Guideline (2008), the injury rate of miners in Zimbabwe is 131 per 1000 exposed workers per year. The rates sideline the actual number contributed by contractors, visitors and other stakeholders hence making it difficult to address the issue of these stakeholders therefore this warrants for a research to see if contractors, visitors and other stakeholders are contributing to the injury rates in industries.
2.4 Factors that affect the Implementation of OHSMS in Industries

2.4.1 Leadership

Armstrong (2014) defines leadership as a process of inspiring people to do their best in order to achieve a certain objective. Leaders achieve the tasks that are set for them with the aid of a group of people who are zealous to work together as a team. Demonstrations made by leaders in performing certain tasks inspire the team to be serious when carrying out the tasks and well-motivated (Reason, 1997). If a leader only commands and does not demonstrate how something is done, it strains the relationship between him and the team such that there will be a lack of cooperation and coordination between the two counterparts and OHSMS will be difficult to implement as it suggests the involvement leadership and worker participation (ISO 45001 Information Guide, 2017).

It is the duty of the top management to set up in writing SHE policies, and programs to achieve long and short term goals and to encourage safety suggestions in the organization as this facilitates the efficiency of the management system. It is mandatory that the top management to implement safety education systems for hazard identification and risk assessment, accident analysis and investigation and the enforcement of safety and health rules within the work place vicinity (Kaiser and Islam, 2016). Top management is facing challenges in implementing safety, health and environmental protection programs due to their choices of production processes and substances, production target that has to be met leading to overtime for workers and performance based pay which is negatively impacting on the health and safety of workers. (Mutembei and Tirimba, 2014)

Table 1 showing OHSMS strategies to be adopted by leadership

<table>
<thead>
<tr>
<th>Design</th>
<th>A workplace occupational health and safety system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhibit</td>
<td>A strong management commitment is needed</td>
</tr>
<tr>
<td>Inspect</td>
<td>The workplace for hazard identification and risk assessment</td>
</tr>
<tr>
<td>Establish</td>
<td>Operational procedures and their controls</td>
</tr>
<tr>
<td>Promote</td>
<td>Wellness campaigns</td>
</tr>
<tr>
<td>Develop</td>
<td>Training programs and refresher courses</td>
</tr>
<tr>
<td>Setup</td>
<td>Workers committees</td>
</tr>
<tr>
<td>Monitor</td>
<td>Ongoing programs and policies</td>
</tr>
<tr>
<td>Integrate</td>
<td>Wellness system that supports the strategy</td>
</tr>
</tbody>
</table>
2.4.2 Employee participation

ISO 45001 Information Guide (2017) defines worker participation as the mental and emotional inclusion of people in a group or situation that encourage them to contribute to specific aims and share the responsibility of what is to be done in order to achieve the goals. The definition is made up of three fundamental guiding words that are inclusion, contribute and accountability and these guide the top management into knowing what employee participation is all about (Mutembei, 2014). Inclusion being a basic principle whereby employees are annexed or made part of the system such that they give details or information or they air out their views towards the system as they are the best source of information to the top management and lastly the employees need to be given the responsibility of creating a safe working environment by being thy brother’s keeper hence showing the relationship between leadership, worker participation and accident occurrence (Kaiser and Islam, 2016).

Employee participation in decision making makes the system to be easily accepted and adopted by the worker. This facilitates a change in behavior towards work hence such organizations will have a low rate of occupational injuries and fatalities, minimal worker compensation claims and reduced accident cost. NSSA (2011) is of the view that accident cost breakdown should be communicated to all employees such that everyone knows about how costly it is for an organization to take care of an accident that has occurred, fines for non-conformance should also be communicated especially for improper waste disposal and putting on of adequate personal protective equipment. ILO Convention of occupational health and safety, 1981 (No 155) together with ILO Guidelines on OSHMS wholly support worker participation in work places.

2.5 Major Accident Causation Theories in Workplaces

With time there are some fundamental changes in the academic view pertaining to accident causation and the safety and health system. The trends that are thought to be the pivotal accident causes at work include a deviation from the view that accidents result from a single chain of events and the accumulation of human errors in workplace set ups (Hong and Thomas, 2013). Scholars delineate that there is a series of events that happen prior to the occurrence of the major accidents and this means that each event that happens has the ability to cause the next.
In such a scenario analysts try to trace back to a point where the initial cause can be identified (Reason, 1997).

### 2.5.1 Reason’s Swiss Cheese Model

Reason (1997) defines organizational accidents most likely as situations in which latent conditions arising from aspects such as management decisions, practices and cultural influences combined. This model by Reason shows the dynamics of accident causations that is based on the defense that is it is a defensive system which involves many layers of barriers and each barrier is designed to support the other in order to reduce the likelihood of accident occurrences in a work place. The figure above shows an accident emerging due to holes in barriers and safeguards.

![Reason’s Swiss Cheese Model of 1997](image)

### 2.5.2 Domino Theory

According to the Domino theory that was propounded by Hosseinian and Torghabeh (2012) accidents are attributed to five factors that include the social environment (which are those conditions which make or force workers to take or accept risks); fault of a person; unsafe acts and conditions (thus poor planning, unsafe equipment, and toxic hazardous environment).
These factors are arranged in a way called the domino fashion such that a fall in the first domino results in the fall of the entire. One factor leads to the next until an injury occurs at the end row as illustrated by the figure below.

![Domino Theory of accident causation](image)

**Figure 2.4. Domino Theory of accident causation by Hosseinian and Torghabeh (2012)**

An undesirable event (the root cause) causes a chain of subsequent events leading to an accident. This means that the accident is as a result of a single cause, and if possible that the single cause can be found and made known and removed the accident will not be happening again. In reality accidents always have more than one contributing factor.

### 2.5.1 The Human Factor Theory

The human factors theory of accident causation depicts that accidents are caused by a chain of events ultimately due to human error. It is made up of the following three broad factors that lead to accidents. The figure below illustrates the above notation.
2.5.2 The Bradley Curve

The Bradley curve shows the reaction and anticipation span on behavior. The curve emphasizes on the behaviors that are desired for achieving zero harm. The curve depicts both accident causes and preventive measures that help in the elimination of occupational accidents and incidences. The curve was propounded by DuPont and it indicates the journey to zero harm where harm is by choice and not by chance. According to DuPont Solutions, (2013:3) the journey involves five steps that are illustrated by the figure below.
Figure 2.6. Bradley Curve by DuPont 2013:3 images
CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter illustrates the methods and techniques used by the researcher for data gathering and collection to fulfil research requirements. A research is a scientific investigation undertaken following standardized and systematic procedure in order to obtain the most appropriate information (Chiromo, 2006). Data collection procedure used will be systematic and reputable to enhance the obtaining of the best information required. The researcher will use CRD sampling method in the collection of primary data. A qualitative analysis of the workers who are vulnerable to occupation incidences and the due causes of these will be thoroughly evaluated. Questionnaires will be distributed randomly to the employees in all departments and the top management will be interviewed in order to scrutinise their commitment towards implementation of an effective OHSMS.

3.2 Description of Study Area

3.2.1 Location

Zimbabwe Alloys Chrome Limited is in Gweru District of Midlands Province, 5km out of Gweru district along the south west south of the Harare –Bulawayo highway. The map below shows its location. The area is developing commercially and traces of agricultural activities are found though on a small scale. A public road known as Bristol road crosses the site and it connects itself to the Harare to Bulawayo high way that crosses the south-east corner of the study area. Residential areas of Mkoba, Lundi Park, Ivene and South downs are found nearby to the south east and far south west corner of the area.
Zimbabwe Alloys being one of the best Chrome producers worldwide and has hit the market competition both at national and international level with its major markets in Spain and Italy. Zimbabwe Alloys produces high carbon Ferro chrome (which is the cheapest alloy at world market), low carbon Ferro chrome (most expensive at market level) and Ferro silicon chrome (rarely produced due to its low demand at market levels). It acquires its raw materials from the Great Dyke where it has mineral claims in areas like Nether burn, Inyala, Lalapanzi and Mutorashanga. The organisation also is involved in metal recovery from the course dump and using these to produce bricks that are sold to the nearby communities.

3.3 Research Design

A research design is a plan and systematic structure of the investigation that uses a specified criterion in order to obtain evidence that directly addresses the research questions. Research design come in different numbers and examples of these include descriptive, explanatory and policy oriented. The researcher used descriptive survey design strategy in order to understand the actual status of the OHSMS at ZAC as it will reveal facts around the system. Specifically, descriptive design enables the use of observations, case studies and surveys and enhances the acquisition of both qualitative and quantitative data (Polit and Hungler, 2009). The data
collection techniques have several benefits as they provide a multifaceted approach for the collection of data. For example, a survey can help produce statistical records about an event while also explaining on how people experienced that event. However, confidentiality was its primary weakness. The subjects were not honest with the researcher and this was particularly difficult during the interviews. The researcher failed to squeeze out the information from the interviewees as they held it too personal. To avert such limitations, the researcher prepared questionnaires which were strictly confidential not requiring targeted population names.

Descriptive survey is subjective to errors and bias for instance when a researcher designs a questionnaire, questions will be fixed and rigid however the researcher managed to deal with this problem by designing open and closed ended questionnaires which were not only predetermined but flexible enough to integrate all relevant research information.

3.4 Target Population
Target population is a group of people that is recognized as the planned recipient of a research. The targeted population in this study encompassed all workers who were directly involved in the production of Chrome at ZAC. This was because most of them are affected by the decision made by the top management in the production processes in relation to safety, health and the environment. SHE Officers, SHE representatives, Engineering managers, production managers and plant Foremen were also part of the targeted population because they report directly to the authorities hence regarded as influential in the system and are a source of information pertaining to organisational performance. Management representatives such as SHE Manager and the line managers were targeted as key informants for interviews. These key informants were chosen because they are the ones that facilitate the existence of an effective OHSMS system.

3.5 Sampling Procedure
Haralambos and Holborn (2004) defined a sample as a part of a large population that is selected to represent the entire population. More specifically the sample is supposedly expected to have the same characteristics of the whole population in order to avoid obtaining predisposed results. A research that is properly designed will have samples that provide a reliable means of gathering information about a population without examining every member. The researcher used the completely randomised sampling design because of how it captures key population characteristics. It yields characteristics in the sample that are relative to the overall population.
It also provides greater precision. However, like any other sampling designs, the completely randomised design has a higher degree of bias

Fowler (2002), explores that the initial step in sampling is to identify the sampling frame, which is made up of individuals who will be included in the research. This will contribute in providing reliable results as those who respond to the surveys have substantial impact on results. In administering the sampling procedure to determine the number of workers to be sampled from each department, the researcher used completely randomised system (hat system). The number of respondents from each and every department was proportional to its targeted population as illustrated in the table below. The employees were sampled according to their departments. Of the 300 employees altogether at least 22% of the population was required to constitute the sample size. So from the 8 departments only 2% of the sample was needed from each department. Pieces of papers where written yes or no and were shuffled in a hat and those who picked the papers written yes made up the sample population.

CRD was the experimental design chosen by the researcher because it is the simplest design to use, experimental units are essentially homogeneous and is best suited for experiments with a small number of treatments. The researcher fulfilled these requirements of CRD

Table 2: Sample Treatments

<table>
<thead>
<tr>
<th>YES 1</th>
<th>NO 2</th>
<th>NO 3</th>
<th>YES 4</th>
<th>NO 5</th>
<th>YES 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO 7</td>
<td>YES 8</td>
<td>YES 9</td>
<td>NO 10</td>
<td>YES 11</td>
<td>NO 12</td>
</tr>
</tbody>
</table>

The employees work on day and night shift. So the researcher distributed the sampling time in a two weeks’ period to subject all the respondents with the same probability of participating. The first half of the sample size was gathered in the first week and the second half in the second week. Since the research was primarily focused on ZAC, the contractors were excluded from the sample frame and this was a method to homogenise samples. 2% representative sample from each department was gathered by pulling yes or no labelled slips from hat. These 2 treatments are assigned at random to all available experimental units in every department. If the sample size at departmental level is more than 2% (6), the researcher subjected the experimental units to the second level of treatment. This subjected all units to equal chances of selection, thereby meeting the requirements of the experimental design. The appointed SHE Committee members of the organisation was 18 employees and the researcher selected all the members as sample units since they are key informants of the research. 48 units of the sample was gathered from each department and added to the 18 SHE Committee members. The SHE
Committee was made up of 2 members from each department and the extra 2 from SHE department.

**Table 3 below shows the Sample Population**

<table>
<thead>
<tr>
<th>Organization</th>
<th>No. of employees selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHE Committee</td>
<td>20</td>
</tr>
<tr>
<td>Other employees</td>
<td>55</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>75</strong></td>
</tr>
</tbody>
</table>

### 3.6 Research Instruments

**3.6.1 Questionnaires**

Saunders, Bezzina and Saunders (2015) define a questionnaire as a research tool consisting of a series of specific questions for the purpose of gathering information from respondents relating to a research that is being carried out. It standardizes and subjectively gives the vital information on specific areas of concern. The questionnaires were designed in such a way that it had an introductory cover page, which introduced the researcher and gave specifications on why the researcher needed the information for. This was done in order to gain the respondents confidence by guaranteeing them strict confidentiality and privacy towards their responses.

A pilot survey was the initial step before issuing out of the questionnaire to the sample population. The researcher gave 3 pilot questionnaires to each department and randomly selected the respondents prior to the commencement of the data collection process. Hosseinian and Torghabeh (2012) explore the purpose of a pilot survey as a of checking how respondents would respond to the questions and observing areas of concern so that it can be refined for easy understanding and also to evaluate the attitude of the respondents towards the survey being carried out. The result of the pilot test provided an ideal satisfaction to the researcher of the questionnaire’s validity and reliability.

Section A of the questionnaire was based on the demographic profiles of the employees, that is to say, age, gender, years of experience, level of education and occupation. The questions on demographic profiles were assimilated because literature shows that gender, level of education, age, occupation and years of experience are factors that influence OHSMS understanding and performance in organisational set ups. To minimize the deficiencies of questionnaires, the researcher used both open-ended and closed-ended questions. Open ended questions help where there is need for clarification and further probing. Open-ended questions also allowed
the respondents to freely express themselves without fear of anyone or victimization because they were of the conviction that questions held no names or titles of the respondents.

3.6.2 Semi Structured Interviews

According to Chiromo (2006) an interview is a process that encompasses the collection of data through direct interface between the interviewer and interviewee. This means that data is obtained from respondents” by means of inquiry and recording by the enumerator. In this study the researcher used semi-structured interview because they allow issues identified in the research to be explicitly explained. Semi structured interviews are an outline of topics or issues to be covered, but the interviewer is free to differ in wording and order of probing the questions. Semi-structured interviews allowed the researcher to acquire information on the current performance of the OHSMS in reducing work related injuries as compared to the previous years. It also helped the interviewer to assess the commitment of the top management basing on their responses (Hosseinian and Torghabeh, 2012). However, the researcher faced problems whilst conducting the interviews, due to high level of confidentiality at ZAC. Despite the challenges the researcher patiently used strategies and skill to squeeze out information from senior management until it was disclosed. The researcher had to patiently consult senior management until some information required was disclosed.
Table 4: The list of interviewees and reasons for interviewing them

<table>
<thead>
<tr>
<th>INTERVIEWEE</th>
<th>REASON FOR BEING INTERVIEWED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Resources Manager</td>
<td>• He provided information of complaints from workforce pertaining to occupational safety health issues</td>
</tr>
<tr>
<td>Line Managers</td>
<td>• He provided information on how employees are involved in OHS issues</td>
</tr>
<tr>
<td>She Manager</td>
<td>• Provided the evidence of all occupational incidences and their trends.</td>
</tr>
<tr>
<td></td>
<td>• The existence of OHSMS</td>
</tr>
<tr>
<td>Finance Manager</td>
<td>• To obtain evidence on the funds that are channelled to cater for OHS issues</td>
</tr>
<tr>
<td>Engineering Manager</td>
<td>• He gave overall picture of organisation performance level</td>
</tr>
<tr>
<td>She Officers</td>
<td>• They provided information on effectiveness of methods adopted to manage OHS</td>
</tr>
</tbody>
</table>

(n=15)

3.6.3 Secondary Data

The researcher mobilised statistics on lagging and leading performance indicators of ZAC as secondary data and the data was acquired through secondary sources that included the company records on safety and health statistics, lost time fatality and injury rate records, incident reports, SHE committee meetings. Planned job observation reports and visible felt leadership observation records. These documents enabled the researcher to identify the company’s lagging and leading indicators. Hakim (1982), argued that in answering research questions or meeting their objectives few researchers considered the possibility of re-analysing data that have already been collected for other purpose. Therefore, the researcher re-analysed secondary data on lagging and leading indicators so as to answer the research hypothesis in question.

3.7 Data Collection

Permission from ZAC top management to gather information from the key informants through questionnaires, interviews and review of SHE documents was requested and the researcher was
welcomed. The researcher made introductory statements to the respondents and did not directly disclose the aim of the study and its importance to avoid bias and exaggeration. Furthermore, confidentiality of their responses to the questions was assured. The researcher then distributed the questionnaires for and answering and then collected filled in questionnaires from the respondents. Interviews with the key informants was agreed and done on specified time to avoid inconveniences.

3.8 Summary

The chapter looked at the research design, target population, data collection procedure as well as the sampling procedure. The following chapter will focus on data presentation and analysis.
CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS

4.1. Introduction

This chapter covers in detail the research findings with regard to the evaluation of the effectiveness of Occupational Safety and Health Management Systems in reducing injuries, illnesses and fatalities. An analysis of population demography, causes of accident, efficacy of OSH management system in accidents prevention and analyzing the factors that hinder the effective implementation of OHSMS is done in this chapter. The analysed data will be presented in the form of tables, graphs and pie charts.

4.2 Background and Demographic Information of the Respondents

Demographic traits of the respondents including age, sex and levels of education were analyzed in order to have a brief knowledge of the people involved the research study. In that regard, these demographic traits were analyzed in order to understand what conditions are the workers were being exposed to during their working periods. Unsafe work conditions affect people differently depending on their age, sex, experience and their standards of living hence it was critical to understand the demographics of the respondents so that the effectiveness of the existing OHSMS will be evaluated.

4.2.1 Response Rate of the Respondent

![Figure 4.1: Response Rate of the Respondent](image)

The researcher issued out 75 questionnaires to the respondents and of the 75, 70 questionnaires were responded to and returned to the researcher. Of the 70 that were filled and returned, 3 did not address the demands of the questions being asked hence were regarded as invalid and 1 was spoiled.
The Figure above shows that the 66 questionnaires that returned gave a response rate of 88%. A response rate above 61% is assumed to yield accurate result hence the results were consistent.

### 4.2.2. Gender Composition of the Respondents

![Gender Composition of ZAC](image)

**Figure 4.2. Gender Composition of ZAC**

Basing on the gender of the respondents, it is clear that the research study area is dominated by men considering the type of activities that are done there. 16% (11) were females and 84% (55) were males. The number of both sexes was not equal meaning to say that OHS issues mostly affected men than women though it is a subject of both sexes. Females were said to occupy mainly administrative jobs and culinary positions. Males constituted more than three quarters of the whole population because of most activities being carried out which are more menial and require manual labour.
4.2.3. **Marital Status**

![Marital Status Bar Chart]

**Figure 4.3. Marital Status of Workers at ZAC**

The figure above illustrates the marital status of the respondents. 77% (51) respondents were married. 11% (7) were single, 8% (5) divorced the least were 4% (3) widowed. These statistics indicate that married people make up the largest cluster (77%) which implies that results were from matured and responsible people hence the results yield were accurate.

4.2.4. **Age of the Respondents**

**Table 5: Age of the respondents from primary data**

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;21</td>
<td>3</td>
<td>1.9%</td>
</tr>
<tr>
<td>22-30</td>
<td>26</td>
<td>46.3%</td>
</tr>
<tr>
<td>31-40</td>
<td>29</td>
<td>38.4%</td>
</tr>
<tr>
<td>41-50</td>
<td>5</td>
<td>9.6%</td>
</tr>
<tr>
<td>51+</td>
<td>3</td>
<td>3.8%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>66</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

The age of the respondents was divided into five age groups that is from <21years; 22-30years; 31-40years; 41-50years and 51+. However, most of the respondents were drawn from an age range of the economically active age group thus between 18 and 40 and are at the peak of their careers hence they were very keen to provide adequate information pertaining to the existence and performance of the OHSMS in the organisation and this helped the researcher to make
assessments of the effectiveness of the system. The graph below shows the percentage of the respondents in each age group.

4.2.5 Period of employment

![Graph showing period of employment]

**Figure 4.4: Period of Employment**

The figure above indicates the length of services provided by the respondents to the organization. The findings revealed that 3% of the respondents have been in the service for a period between 1-5 years then 46.9% for a period of between 6-10 years which appears to have the highest frequency. 16.6% served the organisation for a period of 11-15 years and 16.6% served the organisation for more than 15 years. An average of 69.7% served the organisation for more than 5 years, hence they were in a position to give satisfactory information about the effectiveness of OHSMS in preventing occupational injuries and fatalities.

4.2.5. Respondents according to employment grade and educational levels.
Figure 4.5 showing the educational levels of ZAC workers

The figure above shows the various levels of education for the employees. 33% of the employees acquired Level and another 33% acquired A’level.25% got diplomas or degrees h, 6% goes to those who are post graduates and the least goes to others though there are no specification. From the statistics above there is clear evidence that the respondents were able to read and write hence the results produced were informed results.
Cross tabulation of academic level of employees and conductions of safety audits

Table 6: Academic Qualifications * Conductions of safety audits Cross tabulation

<table>
<thead>
<tr>
<th>Qualifications</th>
<th>Conductions of safety audits</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very great extent</td>
<td>Great extent</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>O level</td>
<td>2</td>
<td>20</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>A level</td>
<td>10</td>
<td>12</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>degree/ diploma</td>
<td>7</td>
<td>10</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>post graduate</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>42</td>
<td>66</td>
<td></td>
</tr>
</tbody>
</table>

The results on table 6 indicate that 20 respondents who have attained ordinary level revealed that to a great extent they conduct safety audits as one of the elements that constitute an effective OHSMS at ZAC, while those that have attained Advanced level and indicated the same were 12. Overall, 24 respondents showed that to a very great extent conducts of safety audits is one the elements that constitute an effective OHSMS at ZAC and 42 identified it to a great extent.

Table 7: Chi-Square Tests of association between academic level of employees and conductions of safety audits

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>11.600*</td>
<td>4</td>
<td>.021</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>15.509</td>
<td>4</td>
<td>.004</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>9.806</td>
<td>1</td>
<td>.002</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The results on table 7 indicated that Pearson chi-square statistic of 11.600 (with a p-value of 0.021) and the likelihood chi-square statistic of 15.509 (which also gives a p-value of 0.004). So, with an alpha level of 0.05, the study can conclude that there is a significant association between academic level of employees and conductions of safety audits.

4.3. Causes of Accidents at Zimbabwe Alloys Chrome

Data on the causes of accidents at Zimbabwe alloys chrome as well as their ranking in percentages was also collected through the use of questionnaire and interviews. The table below presents a detailed summary on the outcomes.

Table 8: Causes of Accidents and their frequency from primary data

<table>
<thead>
<tr>
<th>CAUSES OF ACCIDENTS</th>
<th>FREQUENCY</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsafe behaviors by workers</td>
<td>high</td>
<td>29%</td>
</tr>
<tr>
<td>Unsafe working environments</td>
<td>medium</td>
<td>20%</td>
</tr>
<tr>
<td>Lack of training on equipment use</td>
<td>low</td>
<td>11%</td>
</tr>
<tr>
<td>Production pressures</td>
<td>Medium</td>
<td>14%</td>
</tr>
<tr>
<td>Inadequate supervision</td>
<td>low</td>
<td>13%</td>
</tr>
<tr>
<td>Use of unskilled labor force</td>
<td>low</td>
<td>13%</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

(n=66)

As shown in the table above, the major causes of accidents that have a higher frequency are unsafe behaviours by workers with 29%. This means that workers are exposed to unfit conditions that can include working in exposure to harsh weather condition (heat, cold, sun), dust, short cuts and attitude towards SHE initiatives as they assume that OHS initiatives delay production. Unsafe working environment is yet another cause of accidents in the order of hierarchy above and these include use of defective equipment (vehicles that are not serviced,
that have no fire extinguishers, doors, obsolete and faulty). The least of the causes being lack of training. This is symbolic of a committed form of leadership as it provides the employees with maximum training especially in areas like machinery operation, first aid and fire fighting. This portrays the effective status of the OHSMS as such employees can be able to safeguard their health and safety in case of an accident.

Some of the unsafe work behaviours include wearing that employees do include removing PPE claiming that it makes them uncomfortable or simply because it is hot. It's mandatory that the PPE provided by the employer should be worn always because it helps prevent injuries in cases that the engineering and administrative controls have failed. So the employer brought in the issue of fines to anyone who is seen putting on the PPE inadequately. In the case of hot weather conditions that the employees complained about, the employer installed air conditions in all building and in the case of furnaces the employer provides cool drinks and cold water hence the employer proves to be committed. Most of the workers volunteer to work overtime simply because they want more money and forgetting the importance of resting after an 8hr shift at work.

Use of unskilled personnel is one of the issues that the ZAC leaders are careful about. All the unskilled labor force is trained well before they commence work because they fear the implications of using someone who is not well versed on how certain tasks should be carried out (Howard, 2016). After the induction of work commencement the employer makes sure that he provides the needed PPE to the new recruits as they will be trained for 1 month on all the most essential initiatives that help in the reduction of OHS injuries.

The figure below illustrates the training courses provided by the employer and their responses
Figure 4.6 shows the types of training courses received at ZAC

The graph above shows the initiatives that the top management put in place to ensure that all personnel who need training receive it as it is expected. Behaviour Based Initiatives show that 51% of the employees received the training. However, the 49% that did not receive trainings on BBI might be the ones who practice unsafe behaviours in the work place, and are well versed in it. First Aid (81%) training which has the highest frequency of people who admit that they have received training that is adequate and the same goes to fire fighting with 66% yes.

Communication of Organisational SHE Policy and Objectives to all workers
Figure 4.7 Shows Top Management Commitment

The purpose of the policy statement is to express the commitment of the employer to health and safety culture in the organisation. The policy should be communicated to all employees in a way that all workers can understand. This also has to be put on notices boards and the organisation’s gallery where all workers can see it always. Basing on the data that was collected by the researcher it is clear that ZAC is conforming with the mandatory requirements pertaining an organisational SHE Policy (Froneberg, 2005). 61% of the responses show that they were aware of its existence at all and only 10% of the responses from the people who are not sure about its existence. This depicts how leadership at ZAC is committing itself in ensuring that the existing OHSMS aims for continual improvement. The fact that the 61% people who responded yes shows that the management effectively communicated the existence of the policy and its objectives.

4.4.1. Visible Felt Leadership (VFLS) and Planned Job Observations (PJOS)

![Bar chart showing VFLS and PJOS](chart.png)

(n=66)

Figure 4.8 shows the VFLs and PJOs
Most industries do carry out Visible felt leadership and planned job observations for their workers so that they understand what the workers go through. Out of 66 responses 52% were observed and coached while carrying out their tasks. This means 52% of the total population was being observed by management. On planned job observations 66% of the total population was observed. According to OHSAS 18001, managers should provide visible demonstration of their commitment to OHS by taking part in activities that are being done by their workers so that they will understand what difficulties their workers are going through. Means of demonstration can include visiting and inspecting sites (Judith, 2010) supports the above as she feels that the way leadership should behave because it is the primary method for getting a positive safety message across to employees.

Table 9: Cross tabulation of Visible Felt Leadership and period of employment

<table>
<thead>
<tr>
<th>Count</th>
<th>Period of Employment</th>
<th>Very great extent</th>
<th>Great extent</th>
<th>neutral</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-5 yrs.</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>6-10 yrs</td>
<td>10</td>
<td>20</td>
<td>1</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>11-15 yrs</td>
<td>5</td>
<td>10</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>&gt;15 yrs</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>30</td>
<td>30</td>
<td>6</td>
<td>66</td>
</tr>
</tbody>
</table>

The findings of table 7, indicated that 30 respondents indicated that to a very great extent Visible Felt Leadership is one the roles played by leadership and worker participation in reducing workplace incidence at ZAC. Of the 30 respondents, 13 have period of employment greater than 15 years, while 10 were in the periods 6-10 years and 5 were of the period 11-15 years.

Table 10; Chi-Square Tests of association between Visible Felt Leadership and period of employment
Since the p-value ($p=0.001$) is less than the chosen significance level $\alpha = 0.05$, the study concluded that there is an association between visible felt leadership and period of employment.

4.5. Worker Participation in reducing work related incidences.

4.5.1. Hazard Identification and Risk Assessment

![Figure 4.9. Worker participation in reducing accidents](image)

Employees play a pivotal role in reducing OHS incidences as they also take part in hazard identification and risk assessment before they carry out any task. This shows their zeal in reducing accidents though not all of them take part.

4.5.2 Role played by leadership and worker participation in reducing workplace incidences.
The research probed on the role played by leadership and worker participation in reducing workplace incidences using a 5 point likert scale questionnaire (no extent=1; little extent =2; uncertain =3; great extent =4; very great extent= 5) and the responses were computed using mean values as shown on table 7 below.

Table 10: shows Role played by leadership and worker participation in reducing workplace incidences

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic</td>
<td>Statistic</td>
<td>Std. Error</td>
</tr>
<tr>
<td>Training courses</td>
<td>66</td>
<td>4.8905</td>
<td>.19048</td>
</tr>
<tr>
<td>Communication of</td>
<td>66</td>
<td>4.7843</td>
<td>.18443</td>
</tr>
<tr>
<td>Organizational SHE Policy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan Job Observations</td>
<td>66</td>
<td>4.7603</td>
<td>.01003</td>
</tr>
<tr>
<td>Visible Felt Leadership</td>
<td>66</td>
<td>4.5286</td>
<td>.11066</td>
</tr>
<tr>
<td>Hazard Identification and</td>
<td>66</td>
<td>4.5100</td>
<td>.12789</td>
</tr>
<tr>
<td>Risk Assessment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>66</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The study findings indicated that to a very great extent training courses (mean=4.9; SD=0.0), communication of organizational (mean=4.8; SD=0.5), SHE policy plan job observations (mean=4.8; SD=0.1), visible felt leadership (mean=4.5; SD=0.1) hazard identification and risk assessment (mean=4.5; SD=0.0) were the roles played by leadership and worker participation in reducing workplace incidence at ZAC.
4.6. Lost time injuries

14% of the respondents believed that occupational stress is responsible for lost time injuries that occurs. Figure 4.8 shows that 0.38 was lost time due to injuries per million hours worked. The research interviews revealed that lost time injuries frequency rate rose from 0.26 million man-hours worked in 2013 to 0.38 in 2014. The increase in lost hours due to injuries leads to a reduction in productivity and hence the organization’s performance will also dwindle. ZACs production is largely determined by lost time injuries frequency rate. The figure below illustrates the trends of accidents from the year 2011 to the year 2017. The trend shows a fluctuation in the occurrence of these incidences as the years’ progress. 2016 shows a steep rise in occupational incidences as they reached 140 incidences per year. This is a clear indication that the causes of injuries might be due to an ineffective OHSMS that fails to implement measures that safeguard the safety and health of the employees. The accidents could be traced and indications may highlight that the unsafe environments that workers are exposed to facilitated the increase in occupational injuries. According to Kelloway et al., (2008) OHS has fast became a growing concern if unprotected and no necessary measures are taken into consideration to safeguard the wellbeing of employees then it automatically means that accidents are inevitable hence increasing lost time injury frequency rate that will slow production and will not promote the potential of investments.

Figure 4.10: Lost time injuries at ZAC
4.6.1 Relationship between occupational health and safety management system and number of accidents at ZAC: Regression Analysis

It includes Model Summary, ANOVA and Coefficients. A multivariate regression model was used to determine the relative importance of each of the four variables (training courses, communication of organizational SHE policy, plan job observations, visible felt leadership, hazard identification and risk assessment) with respect to customer satisfaction. Number of accidents was used as a dependable variable.

The multiple regression model for the study as shown:

\[ \text{OHSMS} = \beta_0 + \beta_1 \text{TC} + \beta_2 \text{SHE} + \beta_3 \text{VFL} + \beta_4 \text{HRA} + \epsilon \]

Where; \( \text{OHSMS} \) = Occupational Health and Safety Management System, \( \text{TC} \) = training courses, \( \text{SHE} \) = SHE policy, \( \text{PJB} \) = plan job observations, \( \text{VFL} \) = visible felt leadership and \( \text{HRA} \) = hazard identification and risk assessment. \( \epsilon \) = standard errors

Table 11: Model Summary of OHSMS and number of accidents

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-.788*</td>
<td>.811</td>
<td>.7679</td>
<td>.42466</td>
</tr>
</tbody>
</table>

Predictors: (Constant), TC,SHE,PJB,VFL,HRA

According to the multivariate linear regression analysis results in table 4.1 the co-efficient of determination (R) value was found to be 0.788. This implies that there was a very strong relationship between the independent valuables (training courses, communication of organizational SHE policy, plan job observations, visible felt leadership, hazard identification and risk assessment) and the dependent valuable (accidents). The significance value of \( p=-0.002<0.005 \) indicated that the relationship between independent variables and the dependent variable was statistically significant and negative. Value of R Square was 0.811 showed that 81% variation in accidents numbers was due to the independent variables (training courses, communication of organizational SHE policy, plan job observations, visible felt leadership, hazard identification and risk assessment).
### Table 12: ANOVA of OHSMS and number of accidents

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Regression</td>
<td>1.823</td>
<td>1</td>
<td>1.823</td>
<td>10.107</td>
<td>.002a</td>
</tr>
<tr>
<td>Residual</td>
<td>10.279</td>
<td>19</td>
<td>.180</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>12.102</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), TC, SHE, PJB, VFL, HRA
b. Dependent Variable: OHSMS

The computed F-statistic of 10.107 ($p=-0.002<0.05$) indicated that the model was highly significant, thus the model was statistically significance in predicting how OHSMS influences number of accidents at ZAC.

### Table 10: Beta coefficients of OHSMS and number of accidents

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>-2.856</td>
<td>6.552</td>
<td>-9.436</td>
<td>.66</td>
</tr>
<tr>
<td>TC</td>
<td>-.847</td>
<td>.290</td>
<td>-.788</td>
<td>6.368</td>
</tr>
<tr>
<td>SHE</td>
<td>-.742</td>
<td>.604</td>
<td>-.713</td>
<td>7.566</td>
</tr>
<tr>
<td>PJB</td>
<td>-.509</td>
<td>.816</td>
<td>-.404</td>
<td>2.011</td>
</tr>
<tr>
<td>VFL</td>
<td>-.844</td>
<td>.675</td>
<td>-.778</td>
<td>4.003</td>
</tr>
<tr>
<td>HRA</td>
<td>-.754</td>
<td>.123</td>
<td>-.623</td>
<td>5.134</td>
</tr>
</tbody>
</table>

a. Dependent Variable: OHSMS
On the basis of the Beta coefficients, the model showed that, holding all other independent variables constant, every unit change on training courses (TC) shall decrease number of accidents by -0.788 and also t-value (6.368) was significant ($p=0.001<0.05$), so there was a negative relationship between training and number of accidents. The relationship between SHE policy and number of accidents was also negative and statistically significant ($p=0.000<0.005$). The study findings indicated that every unit change in plan job observations (PJB) shall affect number of accidents by -0.404 ($t=2.011; \ p=0.003<0.005$). The findings revealed that holding all other independent variables constant, every unit change on visible felt leadership (VFL) shall decrease customer satisfaction by -0.778 and also t-value (4.003) was significant ($p=0.000<0.005$), so there was a negative relationship between visible felt leadership and number of accidents. The study result further indicated that hazard identification and risk assessment (HRA) caused 62.3% decrease in number of accidents and t-value (5.134) was statistically significant ($p=0.002<0.05$) and negative. The overall results indicated there is a statistically significant and negative relationship between occupational health and safety management system and number of accidents at ZAC.

**OHSMS Effectiveness in OHS Related Incidences**

![Figure 4.11: Evaluation of the effectiveness of OHSMS](image)

Most of the respondents (64%) indicated that the existing OHSMS is effective in the mitigation and prevention of occupational hazards and risks at the Zimbabwe Alloys Chrome. The respondents acknowledged that there are awareness programs being undertaken in the
organization and also periodic medical checkups being done always. On workers unless the worker has had an injury or is sick. The research discovered that the SHE supervision in all departments is adequate thus making it easy for OHSMS implementation to be successful as there is coordination and commitment from the responsible departments. Considerable actions have been taken by SHE and HR department to ensure that workers are working under safe working environments, have adequate PPE and are they using the right equipment for the task or activity to be performed. The researcher has also had acknowledgements from the workers as they applaud that there is an effective implementation.

In a study done by (Nyamande, 2015) he identified work pressure as a major reason to minor injuries. The trend shows that the commitment of the top management in promoting safety culture at ZAC is therefore needed. Accidents evidently decreased in successive periods from 2013-2015 and fluctuated in the year 2016 hence it is important to note that the decrease might also be a result of non-reporting of incidents as the study only relied on reported and recorded incidents.

<table>
<thead>
<tr>
<th>Year</th>
<th>NO of incidences recorded</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>99</td>
</tr>
<tr>
<td>2014</td>
<td>82</td>
</tr>
<tr>
<td>2015</td>
<td>66</td>
</tr>
<tr>
<td>2016</td>
<td>140</td>
</tr>
</tbody>
</table>
CHAPTER FIVE: DISCUSSION

5.1 Introduction

This chapter will discuss the key findings of the research project in comparison to other views on the effectiveness of OHSMS. The data collected from managed questionnaires was studied and analysed to interpret the findings. In this chapter the researcher will focus on discussing the objectives of the study and evaluate if the results respond to the set objectives.

5.2 Causes of Accidents in the Organization

Accidents were observed to be mainly caused unsafe acts by workers. All these factors can be attributed to the negative attitude that the workers have developed towards OHSMS initiatives and leadership because they do not prioritise OHS culture. Armstrong (2014) show that if the leadership is poor in implementing OHSMS in the organisation the result on accident occurrences will be high. Maximum coordination and cooperation at ZAC has decreased the rate of occurrence of incidences in the past 4 years thus the researcher concluded that there is an existence of an effective OHSMS implementation due to the committed leadership.

40% of the employees at ZAC attributed the major cause of accidents to inexperience and inadequate PPE. Again the researcher can argue that 60% of the respondents have acknowledge the provision of adequate PPE but due to the negative behaviour of workers they tend not to utilise it as expected. The responsibility of the top management is to provide the appropriate PPE to workers and on time so that their exposure to organisational hazards (dust, hexavalent chromium, heat, falling objects, noise, electricity and confined spaces (Chinda, 2011) thus worker participation in putting on the appropriate PPE should be considered. In India, meat producing firms, also experienced the same issue of unsafe work behaviors by workers but as they introduced the issue of fine worker started conforming with the requirements tus accident and injuries decelerated.

The essence of training has been noticed as companies like Zimplats, Trojan Mine and Freda Rebecca Gold mine offer training courses to all of their employees to reduce their susceptibility to occupational harm. Training of workers on machinery use, firefighting and first aid shows
the commitment of leadership in reducing OHS injuries (Mutembei, 2014) has become a norm in ZAC. In comparison to ZAC, training courses were only provided to all individuals though the criteria of selection is not known.

PJOs and VFLs is yet another issue that address by ZAC leadership. Workers were working without planned job observations during task performance. The researcher observed that workers practiced unsafe behaviors like short cuts, not using SOPs and workers did not properly put on their PPE because of pride and negligence while on job (Weick, 2015).

On another dimension, production pressure is yet another issue of concern. Employers at ZAC put much pressure on workers in production simply because they want to reach unreasonable targets, this causes occupational stress to workers as illustrated by the domino accident causation theory in chapter two. In such a case accident will be inevitable. A case of Botswana last year, a total of 25 suffered casualties in a furnace after working long hours in heat exposure simply because the employer wanted to increase profits (Zohar, 2011). Production pressure is one of the major causes of OHS incidences and it gives room to research on thus ZAC has to slow down on pressurizing workers.:

The same topic reveal that These results reflect the existence of a safety and health culture in the organisation. The twin processes of hazard identification and risk assessment processes has been pointed out as one of the main causes of occupational incidences in many industries hence meaning that it is difficult for workers to appreciate what hazards could affect them. In actual fact most of workers at ZAC are aware of the processes as they have been provided with experts that help them in HIRA. This points to the success of top management to employ experts as illustrated by Figure 2.1. If employees lack adequate training and teaching on how the twin processes are done hence making them more susceptible to injuries (OHSAS 18001:2007). Hakim (1982), is of the view that it is the duty of the employer to make sure that HIRA and Safety Talks are carried out before commencement of any task. Most OHS legislations in Zimbabwe emphasise on the need for HIRA always for example SI 90 of 1990 section 292 emphasises on safety precautions before carrying out a task or before entering into a mine. All these issues point out to the existence of an effective OHSMS.

Data on the causes of accidents at Zimbabwe Alloys Chrome as well as their ranking in percentages was also collected and analysed. The causes of accidents which were collected and analysed and unsafe acts have been deduced as the most popular cause of occupational incidences at ZAC. John (2014) has that human irresponsibility and carelessness is the leading
causal factor of production accidents. This means that in order to deal with occupational injuries, there is a need to deal with employees by making them commit to preventing OHS accidents.

The larger proportion of respondents indicated that the system is effective but there is room for continuous improvement. Safety at ZAC has become a major worry to workers since they work under risky environments that threaten their health and safety. Hosseinian and Torghabeh (2012) state the unsafe environments to include exposure to heat from the sun and furnace, working without supervision, exposure to gases emitted by the furnace, inconsistent supply of PPE, low wages, delayed payments, no universal involvement of workers in OHS programs and the review SHE policy and objectives. (OHSMS at ZAC is always prioritised to meet the long term needs just like other industries in Zimbabwe like Dairy Board that are ISO certified and there is consistence review of their certification to avoid non-conformance (Zohar, 2011).

5.3 OHSMS Awareness Response

The researcher first had to establish if respondents understood the concept of OHSMS. Responses gained were convincing as respondents had deep understanding of the system. Top management and some supervisors interviewed exhibited a good understanding also. Most of the respondents (60%) pointed out that the system was being effectively implemented as everyone knew what it was all about thus showing the effective means of communication between leadership and minority (Chiromo, 2006). Somehow the researcher observed that some of the workers fears of victimisation by employees as they feared even to approach the management if need be. The cordial relationship between the employer and employees suggest that Zero Tolerance principle can be achieved. There some industries in Zimbabwe like ZPC Kariba that are strict when it comes to safety issues as they believe that there is no compromise in Safety. Zero tolerance to OHS harm is their leading principle hence if compared to ZAC as successful management system is exposed (Hosseinian and Torghabeh ,2012)

5.4 Strength of implementation of OHSMS

The study discovered that chrome refinery and metal recovery processes are associated with hazards, risks and environmental aspects that pose as threats to the safety and health of employees and nearby communities through its emissions into the environment (Watson, 2013). In that regard safeguarding the environment was regarded as a strength by ZAC in implementing OHSMS which was introduced in 1974 in a bid to eliminate or reduce occupational injuries associated with its chrome processing activities and waste disposal.
Evidence from the annual accidents statistics insinuates that before the time OHSMS was implemented at ZAC accident hit up to 5% per 1000 workers per year but as time went on after the implementation injuries decelerated to 3% and eventually below 1% per 1000 workers in the twenty first century (NSSA Guidelines, 2017). In a bid to achieve a successful OHSMS, ZAC employed SHE officers who is one of its major strengths because the skilled personnel were available to ensure effective implementation of the system.

5.4 Summary

The chapter covered a detailed discussion of the findings from the research study. It was established that OHSMS is very important in reducing occupational incidences. The study observed that ZAC has limited strategies in place to prevent and work against accidents as guided by OHSMS standards. A number of challenges continue to hamper and threaten to reverse the effectiveness of OHSMS in accident and illness prevention among workers as discussed in detail earlier in this chapter.
CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The research findings show that leadership has direct impact on reducing OHS incidences to a greater extent. The findings further suggest that the development of an effective OHSMS requires good leadership and worker participation without others compromising other work related activities. A successful OHSMS is dependent upon management commitment and clear demonstration of leadership. Continuous improvement of quality, environmental aspects and health and safety can help to ensure that an organisation’s leadership is committed to get on the continuous improvement journey toward sustainable growth.

The study discovered that there is need for continual improvement the OHSMS at ZAC inorder to reduce occupational accidents and sickness (Manager et al., 2017). The study observed that ZAC is adopting the various strategies to prevent and militate against accidents as guided by OHSMS standards. A noticeable gradual traits of deviations from implementing and adopting the prevention and mitigation strategies was noted through the increase of work related accidents.

Apart from that, causes of accidents were found to be production pressure and unsafe acts to a greater extent. Findings highlighted the relegation of the system and prioritization of safety. Hosseinian and Torghabeh (2012) say is the duty of the management to address safe production not the way round of production first and provide training from issues raised from accidents investigation and available leading indicators. In an assessment of these findings it was concluded that causes of accidents, illness and injuries were generally springing from the behaviors of workers hough to a lesser degree leadership can also cause.

6.2 Recommendations

- ISO 45001:2018 certification by the organisation as it contains clauses that help in the improvement of the existing OHSMS.
- Periodic assessments to keep companies committed to OHSMS. This can be done through site visits to the workplace or project area, or through document review.
- Management to show commitment in minimizing risks in the operations and complying
With all relevant safety and health issues by providing a safe working environment for employees in terms of infrastructure development.

- Management to accept the responsibility for safety and health and be role models. They must willingly become involved in safety and health and change their attitudes to risks.
- Increase fines of those who deviate from the rules and regulations.
- Active health and safety committees should be given full mandate to implement their recommendations and should be chaired and headed by the manager.
- Continuous measuring and analysing of OHSMS reports statistically to understand the impact OHSMS has on their operation and business.
- Management should continually fund the OHSMS process with resources for the continual development of the OHSMS of the organisation.
- Worker participation in decision making
- Refresher courses to be provided to all employees fairly
REFERENCES LIST


APPENDICES

Appendix 1: Questionnaire for the employees

**Occupational Health and Safety effectiveness evaluation questionnaire for Zimbabwe Alloys Chrome Company.**

The researcher, Thasos Marimba, is a student at Bandura University who is carrying out an academic research on evaluating the effectiveness of Safety Health and Environmental Management Systems at Zimbabwe Alloys Chrome in partial fulfilment of the requirements of BES SHEM degree that the researcher is studying. The researcher guarantees maximum privacy and confidentiality to all the responses given in this questionnaire for security purposes. No names or phone numbers are to be written on this questionnaire. Honest and truthful responses will be greatly appreciated.

Answer the following questions by ticking where applicable

**Section A: Personal Details**

1. Gender
   - M
   - F

2. Age group in years
   - ≤21
   - 22-30
   - 31-40
   - 41-50
   - 50+
3. Marital status

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
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4. Level of Education

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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
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<td>Secondary</td>
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<tr>
<td>Certificates</td>
<td></td>
</tr>
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<td>Degree</td>
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5. Period of employment

<p>| |</p>
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<td>1-5</td>
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<tr>
<td>16-20</td>
</tr>
<tr>
<td>20+</td>
</tr>
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</table>

6. What is your occupation at Zimbabwe Alloys Chrome.........................?

Section B: Causes of Accidents in the Organisation

7. Basing on your observations can the following causes be attributed to the repeated occurrences of accidents within your work place?

*This question requires you to use YES/NO responses*

<p>| | |</p>
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<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Unsafe behaviours by workers</td>
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<tr>
<td>Unsafe working environments</td>
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<tr>
<td>Lack of training on equipment use</td>
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<tr>
<td>Production pressures</td>
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<tr>
<td>Inadequate supervision</td>
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</tbody>
</table>
Use of unskilled labour force

8. Role played by leadership and worker participation in reducing workplace incidences.

Indicate the extent to which the following roles are being played by leadership and worker participation in reducing workplace incidences at ZAC


<table>
<thead>
<tr>
<th>Element</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>Training courses</td>
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<tr>
<td>Communication of Organizational SHE Policy</td>
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<tr>
<td>Plan Job Observations</td>
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<td>Visible Felt Leadership</td>
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<tr>
<td>Hazard Identification and Risk Assessment</td>
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</table>

9. Elements that constitute an effective OHSMS

Indicate the extent to which the following elements constitute an effective OHSMS at ZAC


<table>
<thead>
<tr>
<th>Element</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>Communication and consultation</td>
<td></td>
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<tr>
<td>Conductions of safety audits</td>
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<tr>
<td>Monitoring of daily safety procedures</td>
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<td></td>
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<tr>
<td>Training and safety awareness campaigns</td>
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</tbody>
</table>

56
10. Factors that hinder the effective implementation of OHSMS at Zimbabwe Alloys Chrome

Indicate the extent to which the following factors that hinder the effective implementation of OHSMS at Zimbabwe Alloys Chrome

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<th>Z</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Poor communication</td>
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<tr>
<td>2</td>
<td>Irregular execution of safety audits</td>
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<tr>
<td>3</td>
<td>Lack of resources</td>
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<tr>
<td>4</td>
<td>Poor leadership</td>
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<tr>
<td>5</td>
<td>Production pressure</td>
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</table>

11. Of the above noted causes which one can you suggest to be the prime cause of accidents at Zimbabwe Alloys Chrome? Give a reason for your answer

…………………………………………………………………………………………
…………………………………………………………………………………………
…………………………………………………………………………………………
…………………………………………………………………………………………

12. Are there any training courses on use of machinery offered by your employer? If YES / NO specify?

…………………………………………………………………………………………
…………………………………………………………………………………………

13. How often does your employer provide for your Personal Protective Equipment?

…………………………………………………………………………………………

14. Are you aware of the existing SHE Policy, its objectives and the related legal and other requirements? If YES or NO give a reason

…………………………………………………………………………………………
…………………………………………………………………………………………

15. Are the Safety Talks carried out as they are supposed to? If YES / NO Give an example of a Topic that you once discussed?

…………………………………………………………………………………………

Section C: Management evaluation
16. Do you know about behaviour based safety? √ where applicable

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>NOT SURE</th>
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If YES, briefly explain what it is all about…………………………………………………………
……………………………………………………………………………………………………………….

17. Have you ever been observed while performing a certain task (Visible Felt Leadership and Planned Job Observation carried out whilst you were doing your task? YES, specify who supervised you and what were their comments
……………………………………………………………………………………………………………….

18. How do you report an accident to the authorities?
……………………………………………………………………………………………………………….
……………………………………………………………………………………………………………….
……………………………………………………………………………………………………………….

19. Is there a procedure of documenting accidents? ……………………………

20. How long does it take for a reported accident to be actioned upon by the responsible authorities?……………………………………………………………………………………………………
……………………………………………………………………………………………………………….

21. What kind of communication is used to report an accident that has occurred in the plant to the administration offices?         ................................................

22. Is there an involvement of visitors and contractors in Occupational safety and Health issues and programs? ……………………..

23. If yes give a brief explanation on how they are involved?…………………..

24. Are accidents and their corrective measures clearly communicated? ………

25. Are training courses provided to all individuals? ………………….

Section D: Safety Culture and establishment of OHS

26. Do you receive Occupation Safety and Health training on your job?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>SOMETIMES</th>
</tr>
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</table>

27. If yes do you think the training will help to reduce accidents?
28. Do you have values as an organisation which you are working for? YES, or NO and give reasons.

29. Have you ever heard about Zero tolerance to unsafe behaviours?

30. Do you understand what it is all about?

31. Do you think it can be achieved at ZAC? Explain your answer.

Appendix 2: Interview Guide for the top management and line managers

Occupational Health and Safety effectiveness evaluation interview questions for Zimbabwe Alloys Chrome management.

The researcher, Thabiso Matimba, is a student at Bindura University who is carrying out an academic research on Evaluating the effectiveness of Safety Health and Environment Management Systems at Zimbabwe Alloys Chrome in partial fulfilment of the requirements of BES SHEM degree that the researcher is studying. The researcher guarantees maximum privacy and confidentiality to all the responses given in this questionnaire for security purposes. No names or phone numbers are to be written on this questionnaire. Honest and truthful responses will be greatly appreciated.

1. How many years have you been providing services to Zimbabwe Alloys Chrome?

2. Is there an existing OOHSMS?

3. Are there set objective, targets, programs and legal structure? If YES are they documented and clearly communicated to all the workers?
4. How far have you achieved in meeting the requirements of the above?
........................................................................................................................................................................
...........................................................................................................................................................

5. If YES give a brief interpretation of the following
   i)  Environmental policy.................................................................
   ii) Safety policy.................................................................
   iii) Health policy.................................................................

6. Do the employees perform pre task hazard identification and risk assessment for both routine and non-routine activities? If YES, what is the existing evidence do you have................................................................................................................................................

7. Do you rank the hazards and risks in the organization and how?
........................................................................................................................................................................
........................................................................................................................................................................
........................................................................................................................................................................

8. Are the employees allowed to stop work that threatens their health, safety and the environment? .................

9. How do you communicate with the employees?..............................

10. Is there a full participation of workers in issues that concern their safety, health and the environment? .................

11. Are SHE representatives available in all shifts? If YES are the representatives appointed by the training department?..............................

12. How frequent do you carry out Job Safety Analysis?..............................

13. Does the organization have a Behavior Based Coordinator? .................

14. Do you carry out external and internal audits?..............................

15. How often do you carry out management review?.................