A TRAINING PROGRAM TO SUPPORT MANUFACTURING INDUSTRIES TO PREVENT OCCUPATIONAL ACCIDENTS IN THE POLOKWANE MUNICIPALITY

by

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THESIS

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CO-SUPERVISOR: Prof TM Mothiba

2022

DECLARATION

"I declare that the thesis hereby submitted to the University of Limpopo, for the degree of Doctor of Philosophy, entitled **A training program to support manufacturing industries to prevent occupational accidents in the Polokwane Municipality,** has not previously been submitted by me for a degree at this university or any other university, that it is my work in design and in execution, and that all the material contained herein has been duly acknowledged".

02 May 2022

Date

DEDICATION

The document is dedicated to the following:

- √ My late wife Sefura Daisy, you might not see this physically but Spiritually you will. Rest in Peace;
- √ My two kids;
- √ Professor TM Mothiba, we have been through the same mentally-draining challenges, may God continue to shine His face upon you.

All Glory be to God the Almighty

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The work done by the following contributors is hereby acknowledged:

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- Prof SF Matlala for all the assistance
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  The management of all manufacturing industries that are in the Polokwane municipality assisted a lot by allowing me to conduct the study at their industries. Without your cooperation I would not have accessed your industries and collected data. Thanks!

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- The UL Student Health Centre staff

For always affording me time to focus on the project.

ABSTRACT

Background: The number of occupational injuries in manufacturing industries continues to rise despite safety regulations. Occupational injuries range from the spine, hands, head, lungs, eyes, skeleton and skin. Negligence, improper use of Personal Protective Equipment, lack of experience and age are some of the factors leading to occupational injuries. Even though there are measures to prevent these occupational injuries, the number of injuries amongst manufacturing industries keeps rising and the causes need to be identified.

Objective(s): The purpose of the study was to develop a training programme for manufacturing industries in the Polokwane municipality.

Methods: A qualitative, exploratory, descriptive and contextual design was used for the study. Five categories of manufacturing industries were visited where 22 participants were interviewed using a voice recorder until data saturation was reached. There were 4 managers, 6 supervisors and 12 general workers. Member checking was done to verify and clarify transcribed information. Field notes were also taken for non-verbal responses. Data were analysed using Tesch's and Clarke and Braun open coding method following the eight steps.

Results: The findings of the study indicated that hazards in the physical work environment of manufacturing industries in the Polokwane municipality contributed to most occupational accidents. It was also found that negligence, incorrect provision of PPE by management, improper use of PPE by workers, and lack of safety training were also contributors to workplace accidents. Commitment to health and safety by industries management was also found to be lacking and played a role in some occupational accidents in the manufacturing industries.

Conclusions: The study concludes that lack of health and safety training, negligence, and commitment by those in management compromised the health and safety of workers

Keywords: Accidents, negligence, health and safety

DEFINITION OF TERMS

Occupational accidents are unexpected and unplanned occurrences arising out of or in connection with work, which result in one or more workers incurring personal injuries or death (International Labour Organisation, 2005). In this study, any accident occurring at the workplace is considered to be an occupational accident.

Workplace is a place where employees work on a permanent or temporary basis (Stanton, Kielblock, Schoeman & Johnson, 2007). The definition in the study will be used as a place where workers offer their services to the employer for remuneration.

A hazard is any source of potential damage, harm or adverse health effects on something or someone under certain conditions at work (Bicer, Kucuk, Kececi, Ozturk, Cetinkaya, Ozdemir & Coskunol, 2011). In the study, anything identified that might cause harm to a worker will be considered a hazard.

Personal protective equipment is any device worn by a worker to protect against hazards (Van Dijk, Varekamp, Radon & Parra, 2011). In the study, any clothing put on by workers to protect them against any harm at work is considered PPE.

Fatal accidents are deaths resulting from an accident (Van Dijk, Varekamp, Radon & Parra, 2011). In this study, fatal accidents refer to those accidents that arise from the workplace and result in death of a worker.

Construction industry is a branch of manufacture and trade based on the building, maintaining, and repairing of structures. This includes drilling and solid mineral exploration (WHO, 2010). The definition in the study will be used as any site where there is construction or maintenance of a building or road.

Manufacturing industry is the branch of manufacture and trade based on the fabrication, processing, or preparation of products from raw materials and commodities. This includes all foods, chemicals, textiles, machines, and equipment (WHO, 2010). In this study, the definition will be used to define any industry that processes or prepares products for human use.

Unsafe workplace is a condition at the workplace where something exists that varies from a normal, accepted, safe condition and can result in injury, death, or property damage, if not corrected (WHO, 2010). The definition in the study will be used to define any area within an industry that has hazards that could cause harm to workers.

A worker is defined as any person that provides services in the form of labour; either physically or mentally, to an employer, and who is remunerated. This could either be on a permanent or temporary basis (WHO, 2010). In the study, a worker will include any person working in the manufacturing industries who provides services to an employer and is remunerated for providing such services.

LIST OF ABBREVIATIONS

CCOHS - Canadian Centre for Occupational Health & Safety

DoL - Department of Labour

ILO - International Labour Organisation

OHSA - Occupational Health and Safety Act

OSHA - Occupational Safety and Health Act

PPE - Personal Protective Equipment

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CHAPTER 1

OVERVIEW OF THE RESEARCH STUDY

1.1 INTRODUCTION AND BACKGROUND

An increase in occupational accidents that lead to partial or total disablement and/or deaths remains a major challenge worldwide in various workplaces. Occupational accidents range from hand (Bicer, Kucuk, Kececi, Ozturk, Cetinkaya, Ozdemir & Coskunol, 2011), head, neck and back injuries, sprained ankles, to heat, chemical and electrical burns (Dega, Gnaneshwar, Rao, Ramani & Krishna, 2007). Occupational accidents worldwide are reported to be responsible for an estimated 2.3 million deaths annually, with the number increasing in developing countries each year. Other than fatalities, one major occupational accident commonly reported is eye injuries (Baichoo & Muchiri, 2010).

According to Sukati (2014) in a literature review study on workplace injuries, it was reported that eye injuries are reported in workers worldwide. At least per every 10 000 workplace injuries reported in the USA, 567 are eye injuries. In the UK, at least 70% of reported occupational injuries are eye injuries, whereas in Taiwan it is 39%, in Greece it is 20%, and in Scotland it is 14% (Sukati, 2014). In developing countries like Ghana, Tanzania and Malawi, serious eye injuries were reported among workers in different industries. The major causes of these occupational accidents were due to lack of proper Personal Protective Equipment (PPE) use (Bert, Rekha & Percy, 2016).

In the Turkish city of Izmir, a study conducted on risk factors associated with occupational hand injuries reported that hand tools accounted for most injuries. The majority of those injuries were found to have been due to an error in the of use PPE (Bicer, Kucuk, Kececi, Ozturk, Cetinkaya, Ozdemir & Coskunol, 2011). Dega et al. (2007) conducted a retrospective study among 665 patients who sustained electrical burn injuries in Hyderabad, India and discovered that most of the patients had their hands amputated due to the severity of the occupational accident suffered at their various workplaces.

The International Labour Organisation (ILO) (2006) reported an escalating number of occupational accidents every year and most of these accidents were either fatal or non-fatal. The most recorded accidents occur among workers in the construction and manufacturing industries due to negligence and complacency, lack of knowledge in performing certain duties, age and work experience (Kumar, Rathnakar & Kumar, 2010; Nenonen, 2011).

The Occupational Health and Safety Act (OHSA) (85 of 1993) stipulates that the employer should provide a healthy and safe place for the workers and third parties and for the workers to ensure that they are responsible for their own safety at work. The scope of OHSA (85 of 1993) covers all industry categories irrespective of trade as long as there is work performed for the employer. This Act affords labour inspectors an opportunity to enter any workplace, check for compliance and, where possible, impose penalties for deviations. In Botswana, 2263 occupational accidents were reported amongst all categories of workers during the period January-December 2013, resulting in compensation of P9 887 705.42 (R11 991 035.60) to the victims or their families (Botswana Ministry of Labour and Home Affairs report, 2013).

According to Pinto, Ribeiro and Nunes (2013), occupational accidents could be prevented if employers are able to identify hazards at the workplace. In their study which was conducted in Portugal on ensuring quality of occupational safety risks, the authors identified the use of irrelevant safety models and incomplete health and safety audits as the cause of occupational accidents. They then recommended the health and safety model used in Europe and Australia called the Occupational Safety Risk Association (OSRA), as a way of preventing occupational accidents.

The purpose of the model is to assist those involved in the prevention of occupational accidents to link identified hazards with potential risks, because they will have clear and accurate information linking hazards to attached risks. It is therefore important to have health and safety programmes in all workplaces to demonstrate the commitment by management to health and safety, to link safety at work with performance, and to provide guidance on how health and safety practices and procedures should be applied. A health

and safety programme should be developed by the employer with the involvement of the workers (Weinstock & Slatin, 2012).

Dlamini, Naidoo and Swanepoel (2014) conducted a study amongst paper mill workers in the province of Mpumalanga, South Africa, and reported that in almost all job categories workers were involved in different types of occupational accidents. Records of accidents from 2000-2004 were used to collect data. A total of 341 occupational injuries were reported at one industry for a period of four years. Amongst those who experienced occupational injuries were supervisors (third highest). This indicated a serious challenge regarding health and safety at the mill as supervisors were expected to be taking the lead regarding occupational health and safety.

Although a large number of workers were reported to have been involved in different occupational accidents at the paper mill, the authors may have miscalculated because they assumed in their report that each injury represented one worker. This might have not been the case because one worker could have multiple occupational injuries that were reported separately at different times, depending on when the accident occurred.

The manufacturing industries within the City of Polokwane reported a continuous increase in the number of injuries, diseases and deaths emanating from the workplace, despite the fact that the OHSA (85 of 1993) provides guidance on safety procedures and the provincial government has compliance and enforcement officers who visit different companies to do health and safety inspections. The recent report from the Limpopo Provincial Department of Labour indicated that there may be a challenge regarding compliance to health and safety regulations in this category of industry (Department of Labour Report, 2014). Additionally, there are at least 18 industries offering different trades within the city of Polokwane and 92 occupational accidents were reported from the last quarter in 2012 to the end of 2013 (Department of Labour Report, 2013).

The current study therefore was aimed at developing a training program to support manufacturing industries in the Polokwane municipality to prevent occupational accidents.

1.2 RESEARCH PROBLEM

For the past six years it has been observed during factory walk-throughs that there is a tendency amongst workers to disregard safety regulations at the workplace. Occupational accidents records show that accidents recur on a quarterly basis.

It has been recorded that during the last half of 2012 a total of 33 accidents occurred whereas in 2013 a total of 59 accidents were reported within the manufacturing industries in the Polokwane municipality (Department of Labour Report, 2013). These statistics indicate the severity of the situation in different industries. For example, at one big power station, violations regarding housekeeping and incorrect storage of certain explosives were recorded (Matlala, 2013). This is despite labour enforcement officers monitoring all the industries.

The majority of industries within the manufacturing industry do not have training programmes on health and safety, they instead depend mostly on institutions that specialise in workers' training. The challenge is; however, that industries are supposed to send workers to attend such trainings, which is costly to management. This leads to management ultimately sending few workers for training, and often only after an extended period of employment.

It is therefore important that the factors leading to these occupational accidents be identified and prevented. In this study, a training programme will be developed to assist management in manufacturing industries to prevent occupational accidents in their workplaces.

1.3 THEORETICAL FRAMEWORK

The World Health Organisation developed a Healthy Workplace model that guides both employers and workers on how to develop and sustain a healthy workplace (Burton, 2010). This model, depicted below, was adopted for this study as it describes how events at the workplace should unfold to avoid or minimise occupational accidents. The model explains the design of a workplace and how work should be performed by explaining four avenues; the physical work environment, psychosocial work environment,

personal health resources in the workplace, and enterprise and community involvement (Burton, 2010). This theoretical framework is discussed in full in Chapter 5.

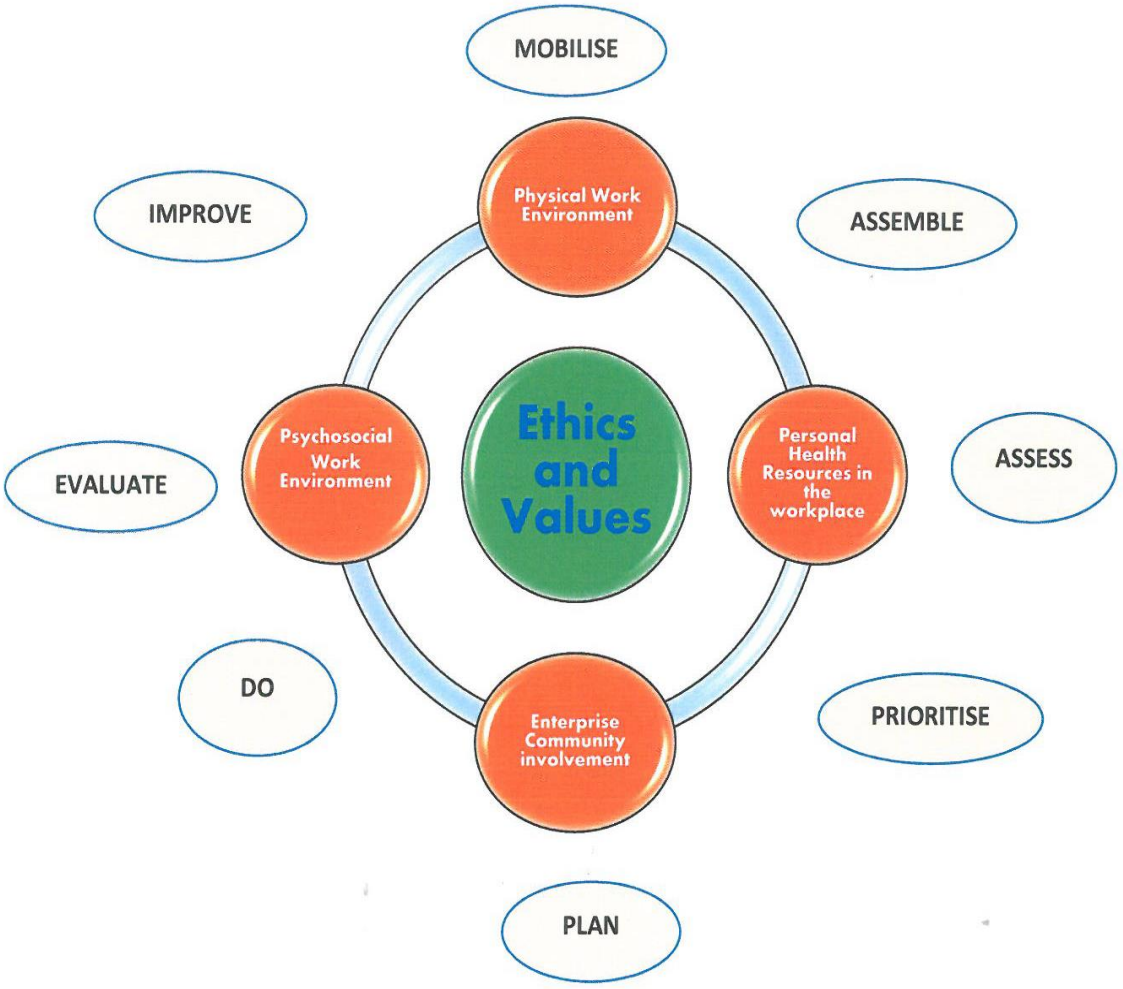


Figure 1.1: Global Healthy workplaces model adopted from World Health Organisation and modified (Burton, 2010).

1.4 PURPOSE OF THE STUDY

The aim of this study was to develop a training program to support manufacturing industries to prevent occupational accidental in the Polokwane municipality to prevent occupational accidents.

1.5 OBJECTIVES

The objectives of this study were to:

- Describe health and safety programmes in the manufacturing industries of the Polokwane municipality

Phase 1

- To explore the causes of occupational accidents in the manufacturing industries of the Polokwane municipality
- To explore and describe training needs of workers in the manufacturing industries of the Polokwane municipality.

Phase 2

- To develop a health and safety training program for manufacturing industries in the Polokwane municipality with regards to the prevention of accidents.

1.6 RESEARCH QUESTIONS

The following research questions guided the researcher throughout the study:

Phase 1

- What are the factors leading to occupational accidents in the manufacturing industries of the Polokwane municipality?
- What are the training needs of workers working in the manufacturing industries of the Polokwane Municipality?

Phase 2

- How can a health and safety training program be developed for manufacturing industries in the Polokwane municipality?

1.7 RESEARCH METHODOLOGY

This section of the methodology is a summary of what is comprehensively discussed in Chapter 3, and is on the method which guided the researcher on how to execute the processes which were followed in the study.

1.7.1 Study Site

The study was conducted amongst selected manufacturing industries in the Polokwane Municipality, Capricorn District, Limpopo Province in South Africa. The categories of industries were clothing and textile, brick manufacturing, iron and steel, chemical processing, and food and beverages production.

1.7.2 Research design

The study applied a qualitative method where the researcher collected data using both interviews and evaluation of training programmes. The proposed study was divided into three phases, Phase 1 (Research design), Phase 2 (Training programme development) and Phase 3 (Implementation and validation of the training program).

1.7.3 Population

The population for the study were workers in all categories of manufacturing industries of the Polokwane municipality, which included clothing and textile, brick manufacturing, iron and steel, chemical processing, and food and beverages production.

1.7.4 Sampling

A non-probability purposive sampling method was used where the different manufacturing industries and individuals were selected based on the knowledge they have regarding the problem studied, with the purpose of trying to understand the occurrence of events in the context of this study.

1.7.5 Data collection

Review of industries' health and safety training programmes, site observations and one-on-one unstructured interviews were conducted amongst sampled individuals and were conducted at their workplace, at times that best suited them to avoid interfering with their duties. Each interview session lasted approximately 35 minutes, until information required was gathered from each participant.

1.7.6 Data analysis

The eight steps of the Tesch's open coding data analysis method was used to analyse data, as described by Creswell (2014).

1.8 MEASURES TO ENSURE TRUSTWORTHINESS

Credibility, dependability, transferability and confirmability, that were used during the study to ensure the trustworthiness of the study are discussed in Chapter 3.

1.9 ETHICAL CONSIDERATIONS

First the researcher presented the document before the Senior Degrees Committee of the School of Health Care Sciences and then sought ethical clearance from the Turfloop Research Ethics Committee (TREC). Upon ethical clearance from TREC, permission to conduct the study was requested from the provincial office of the Limpopo Department of Health and the selected industries in the Polokwane municipality.

1.10 SIGNIFICANCE OF THE STUDY

For the Department of Labour, the training programme may ensure that those responsible for monitoring compliance to health and safety regulations are aware of the conditions under which most workers perform their duties. This may make them inclined to conduct thorough and frequent compliance monitoring.

Furthermore, the training programme might assist workers to become aware that health safety is their first responsibility and that they are aware that any unsafe act will have an impact on their health. The training programme might assist employers to keep a healthy and safe working place by improving the working physical work environment in their industries.

Finally, the findings of the study were presented during the School of Health Care Science Annual Research Week (**APPENDIX I**) and researchers who were in attendance could use those findings for further research.

1.11 ORGANISATION OF THE THESIS

Chapter 1: OVERVIEW OF THE RESEARCH STUDY

This chapter gives an outline of the background to the study, the research problem, the purpose of the study, its aim and objectives, methodology and how the thesis is organised.

Chapter 2: Literature review

This chapter on the review of relevant literature outlines studies related to occupational injuries, and occupational health legislation, both locally and internationally. The chapter outlines the importance of health and safety in the workplace as investigated by different authors and justifies why causes of occupational accidents in the Polokwane municipality should be investigated.

Chapter 3: Methodology

A comprehensive explanation of the study design, population and sampling, how data was collected and analysed, ethical issues that guided the researcher during the study,

measures to ensure trustworthiness and the significance of the study is done in this chapter.

Chapter 4: Results and Discussion

This chapter outlines the results and discussion of the study, which are compared to findings from other studies that are related to occupational accidents**.**

Chapter 5: Theoretical Framework

The World Health Organisation framework for a healthy workplace is detailed in this chapter. This model was used to guide the study on how to investigate occupational accidents among manufacturing industries of the Polokwane municipality.

Chapter 6: Training programme for manufacturing industries of the Polokwane municipality and its validation. This chapter explains how the training programme was developed and validated.

Chapter 7: Summary, Limitations, Recommendations and Conclusions

After the development of the training programme, the researcher validated it and the process of validation is discussed in full in this chapter**.**

1.12 CONCLUSION

The chapter gave an overview and the rationale for why it was necessary to conduct the study in the manufacturing industries of the Polokwane municipality. The researcher attempted to describe the extent of occupational accidents elsewhere and the implications thereof. The methodology section indicated how the study was conducted and how the results were gathered.

The next chapter outlines the review of the literature of studies that investigated occupational accidents globally.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Polit and Beck (2010) define literature review as a summary of research regarding a topic that summarises existing evidence. Literature is reviewed in order for the researcher to design a study in such a way that the research question is answered. The review of different theories and approaches assist with the selection of appropriate methods and tools that are relevant to the investigation (Booth, Papaioannou & Sutton, 2012).

This chapter presents the reviewed literature from studies worldwide, related to the causes of occupational accidents. Search engines such as Science Direct, PubMed and Google Scholar were used for literature search. Only peer-reviewed journals were used to access information that was relevant to the study. Apart from these search engines, methodology text books from credible publishers, together with websites that contained rich information, were used as sources of information.

The literature search focussed mainly on causes of occupational accidents in manufacturing industries and to a lesser extent on occupational accidents in construction industries. The inclusion of some information from construction industries was because literature from these industries also provided information that was relevant to manufacturing industries. Searches were focused on adherence to health and safety, workers conduct, role of management in the workplace, international health and safety standards from ILO (2006), and WHO (2007).

2.2 METHODOLOGY FOLLOWED WHEN DOING LITERATURE REVIEW

For the review of the literature, a systematic approach methodology was used. This method applies four approaches, which are a systematic approach to searching, appraisal, synthesis and analysis.

When using this approach, the reviewer covers as much literature as possible that is relevant to the phenomenon under investigation and searches documents as broad as possible (Booth, Papaioannou & Sutton, 2012).

The quality and the type of sources reviewed should be considered and the selection of quality sources should be guided by a validated tool to ensure that authors are treated fairly. The systematic approach guides the reviewer on how to avoid over-generalising studies by identifying what is invalid within the reviewed studies. The reviewer is then able to arrange and integrate relevant and similar studies together, and new knowledge is then gathered. During the gathering of new information, the reviewer should be able to identify the different presentations of studies being reviewed by focusing on the meaningfulness of the different studies under review (Booth, et al., 2012).

Relevant and related studies that were grouped together are as indicated in Table 5. below. By using the systematic approach, the researcher was able to develop the research question as new information gathered added different insight to what is being investigated. The researcher was able to make a judgement on the type of studies to be reviewed and to clarify the details of each study reviewed. The systematic approach assisted with the selection and gathering of relevant information and the classification and presentation of information with similar ideas.

Table 2.1 Literature topics and sub-topics

Topics	Sub-topics
Global Workplace Health and Safety Advancement	a) WHO Declaration on Occupational Health for All, 1994, b) ILO Occupational Safety and Health Convention (No. 155) of 1981,

	c) WHO 2007 Global Plan of Action on Workers Health, d) WHO Workplace Framework and Model 2010.
South African Occupational Health and Safety Act (85 of 1993)	a) Duties of the employer, b) Duties of the employees, c) Hazardous Chemical Substances Regulation of 1995, d) Noise Induced Hearing Loss Regulation of 2003, e) Environmental Regulation for Workplaces of 1987, f) General Health and Safety Regulations of 1986, g) Electrical Machinery Regulation of 1988, and h) Driven Machinery Regulation of 2015.
Workplace Environment	a) Impact of work environment, b) Workplace design.

Occupational Hazards in the Manufacturing Industries	a) Physical hazards, b) Noise, c) Illumination, d) Extreme of temperature, e) Vibration, f) Chemical hazards, g) Mechanical hazards, and h) Psychosocial hazards.
Compliance to Health and Safety Regulations in Industries	a) Theories related to Health and Safety, Review of literature regarding compliance to health and safety regulations in the manufacturing industries.
Safety Management System	
Age, Work Experience and Workers' Behaviour	
Health and Safety among Workers in Africa	
Training Programme Development	

2.3 GLOBAL WORKPLACE HEALTH AND SAFETY ADVANCEMENT

Occupational health and safety has evolved over the years due to the changing work environment, the inclusion of environmental issues, and the affected communities. The workplace environment is said to consist of the most impact on the physical, mental, social well-being of all workers in all occupations (ILO, 2006). This means that the workplace should not only be treated as a place of production, but issues of health and safety should be given the highest priority (ILO, 2006).

The evolution of workplace health and safety started after the realisation that progress relating to occupational accidents was slow. The number of occupational injuries and fatalities were increasing with little or no action being taken to recognise and address this increase (Acutt & Hattingh, 2011).

2.3.1 WHO Declaration on Occupational Health for All, 1994

The purpose of the declarations made during the meeting that was held by WHO in 1994 was to develop statements in the field of Occupational Health because of the conditions under which workers were performing their duties. The following declaration statements were agreed upon:

- √ The first priority issue was to ensure that workers have access to health services at their respective workplaces because of the number of workers getting injured or dying at work each year.

- √ The second priority issue was to ensure that there is control over the transfer of hazardous substances to developing countries that do not have the capacity or adequate technologies to mitigate exposure to those hazardous substances.

- √ Another key priority issue was to develop measures that will ensure sustainable socioeconomic growth that should allow workers to live a healthy life during their working time and beyond.

2.3.2 ILO Occupational Safety and Health Convention (No. 155) of 1981

The convention was held with the purpose of ensuring that injuries emanating from the workplace be minimised as much as possible. ILO adopted the Occupational Safety and Health policy that aimed at protecting all workers in all job categories. Workers' working hours, organisation of their workplace and the number of working hours should be considered in order to ensure that all workers are capable of performing their duties to the best of their abilities.

The preservation of psychosocial and mental health at work should be done through the development of policies and programmes that could raise awareness for the workers to maintain mental health. Developed programmes should include the identification, prevention and management of the stressors which exist at the workplace. Employers should ensure a safe working environment by:

- √ Ensuring that the workplace and any activity taking place in the workplace should be without risks to the health of the workers.
- √ Ensuring that measures are in place to control any physical, biological or chemical substances at the workplace.
- √ Providing workers with protective equipment in order to avoid accidents. Workers themselves should ensure that they take care of their own health by:
    - Complying with the health and safety regulations as stipulated by law
    - Ensuring that their representatives cooperate with the employer to ensure that the health and safety regulations are adhered to
    - Being offered training relating to health and safety, together with their representatives
    - Being consulted by the employer on and issues relating to health and safety.

2.3.3 WHO 2007 Global Plan of Action on Workers Health

The focus of the plan was to deal with issues relating to the prevention of hazards at work, to protect and promote health at work, and to deal with the conditions of work. Prevention of health hazards should be prioritised and be thoroughly planned, implemented and evaluated in order to confirm the impact of the implemented strategies. Prevention could be done through designing and implementing policies on workers' health and health promotion.

2.3.4 WHO Workplace Framework and Model (2010)

The model describes aspects of the avenues of influence, and the processes and core principles of a working workplace programme. The model is described in full in Chapter 5 of this document.

The advancement of Workplace Health and Safety Globally focused on what workplace health and safety issues are and how they should be addressed. This is because of the ever-changing developments in technology in workplaces and the environment. An improvement of global health and safety in various workplaces led to the passing of declarations and standards to mitigate occupational accidents. The declarations were passed to ensure that workers have access to health services at or near their workplace and also to fight environmental racism. The WHO (2007) and ILO (2006) standards ensure that all workers in all job categories are protected against any harm. The challenges that WHO (2007) and ILO (2006) identified globally remain a concern in the manufacturing industries of Polokwane where occupational accidents were reported to be escalating during the years 2012-2014.

2.4 THE OCCUPATIONAL HEALTH AND SAFETY ACT (85) OF 1993)

The Occupational Health and Safety Act (85 of 1993) was passed to ensure that the health and safety of all workers in all job categories in South Africa is protected. The Act further protects those who might not be workers but are from the surrounding

communities and who have the likelihood of being affected by the activities of work being performed either onsite or outside. Sections of the Act regarding the duties of both the employer and workers and the regulations are discussed.

2.4.1 Section 8: General duties of the employer

This section outlines the duty of the employer, to provide and maintain a workplace that is safe and does not pose any danger to workers. This includes the provision of safe machinery and plants. Identified hazards at the workplace should either be eliminated, minimised or controlled through the use of engineering as soon as possible. The employer is bound by the Act to ensure that all workers in all job categories are provided with supervision, health and safety information, and training.

All supervisors at the workplace are supposed to be trained to ensure that workers in all job categories do not perform any duty that it is too risky or if the worker does not have the necessary skills to perform it.

The employers in the manufacturing industries of Polokwane municipality need to protect workers against any hazards that are found in their workplaces. Various hazards linked to occupational accidents in the industries should be mitigated by the employer by either eliminating or minimising exposure of workers to such hazards.

2.4.2 Section 14 General duties of the employees

It is the duty of employees (workers) to ensure that they take control of safety at the workplace. Workers and employers should also ensure that their work does not place the health and safety of their co-workers, visitors and customers at risk.

Workers in all job categories are supposed to comply with any regulation given to them and they should observe and eradicate unsafe or unhealthy situations in the workplace. If anything occurs, it should be reported immediately to their safety representative and/or the employer. Any incident that happens at the workplace that may endanger the health and safety of the workers or co-workers or has caused an accident should also be

reported to the safety representative, and/or any person nominated by the employer or to the employer immediately.

One of the factors reported to cause occupational hazards in the manufacturing industries of Polokwane municipality was negligence (Department of Labour Report, 2013). Workers within the manufacturing industries in the municipality should ensure that they adhere to safety regulations as provided to them by their supervisors.

2.4.3 Section 10 General duties of manufacturers and others regarding articles and substances for use at work

This section guides any person who designs, manufactures, imports, sells or supplies any article to be used at work to ensure that the article is safe to use and will not endanger the health of those using it.

The substance that is being manufactured, sold, imported or supplied should comply with the required standards and the user should ensure that they follow the manufacturer's guidelines.

All the manufacturing industries in the Polokwane municipality utilise raw materials to manufacture their products. Proper training on how to handle raw materials and produce safe product and safe storage of these products is important.

2.4.4 OHSA (85 of 1993) Regulation

The OHSA (85 of 1993) Regulations apply to everybody in the workplace. These regulations guide employers, workers, customers and visitors of their responsibilities once they enter a place of work. There are several regulations that are related to manufacturing industries of Polokwane municipality according to each industry's trade and they are presented below:

2.4.4.1 Hazardous Chemical Substances Regulation, 1995

This regulation applies to any employer and self-employed individual who is carrying out work that may expose them to Hazardous Chemical Substances (HCS) in the workplace. The regulation further stipulates that training should be offered to anybody using or who

could be exposed to HCS, and the workplace should always be assessed for potential dangers.

At least half of the industries in the manufacturing sector of the Polokwane municipality use chemical substances to produce their products that they sell to the public. Knowledge regarding the threshold limits, type of PPE that is required while handling chemical hazards, and how to handle such chemical substances is important. Training regarding the handling, use and storage should be offered.

2.4.4.2 Noise Induced Hearing Loss Regulation, 2003

The regulation applies to any employer or self-employed person who is or employs any person exposed to noise that could be at or above the required exposure limit. Frequent exposure assessment relating to the noise levels should be conducted in the workplace.

Once exposure assessments are conducted, the employer or any self-employed person should maintain the workplace to ensure that it is safe and should keep records of all incidents, including the results of the assessment. Workers should be offered training regarding the noise zones in the workplace and the proper use of protective equipment.

In the manufacturing industries of the Polokwane municipality workers are exposed to noise during working hours. In some manufacturing industries the noise disturbs the workers' ability to hear moving machinery and vehicles, which poses a danger to those affected.

2.4.4.3 Environmental Regulation for workplaces, 1987

This regulation applies to the physical condition of any work environment. The regulation guides employers, workers and self-employed persons to assess work conditions like extreme temperatures, illumination, ventilation, fire precautions and any work environment that affects how workers perform their duties.

Challenges that are faced by workers in the manufacturing industries of the Polokwane municipality are heat and poor ventilation due to congested working space, uneven floors and noise.

2.4.4.4 General Health and Safety Regulations, 1986

This regulation stipulates the general health and safety of workers within the work environment, which includes the protective equipment that workers should use according to the type of hazards at their work stations. Signage in the workplace that offers warning regarding hazards and possible dangers must be available. Working in confined spaces, stacking, and the use and storage of flammable liquids should be taken care of. Procedures regarding first aid and emergency equipment, and both mounted and moveable ladders must be available. All these should be available in the workplace and all workers in all job categories should be trained on how to use them.

Physical hazards like noise and vibration are some of the challenges faced by workers in the manufacturing industries of the Polokwane municipality. Some of the industries have workers working at heights and using equipment like ladders, fall arrest and hand rails, which could expose workers to the risk of falling from a height.

2.4.4.5 Electrical Machinery Regulation, 1988

The regulation applies to any employer, self-employed or worker who uses electrical machinery while performing their duties at work. Precautionary measures should always be applied when operating any electrical machinery and it is important to ensure that whoever is operating such machinery is properly trained and has the necessary skills. There should also be provision of information with regards to notices, safety equipment, and the use of any electricity-operating device/equipment.

All the manufacturing industries in the Polokwane municipality use electrical machinery for production of their goods and most workers lack training on how to operate them. Some workers are unable to apply safety measures, like lock-off, due to either lack of training or negligence.

2.4.4.6 Driven Machinery Regulation, 2015

This regulation applies to all workplaces that use revolving machinery, circular saws, band saws and band knives, wood-plaining machines, wood-moulding and mortising machines, sanding machines, grinding machines, mixing, agitating and similar machines, shears, guillotines and presses, and slitting machines. Any person who uses any of these

machines mentioned should be trained by an organisation accredited with the Transport SETA. Since all machinery are motor-driven, all users should be supervised at all times.

All the manufacturing industries of the Polokwane municipality use machinery that require strict monitoring whilst in operation. Most workers are exposed to hazards such as abrasions and amputations. The regulation offers guidance on the operation of such machinery and the type of protection workers require to avoid any accidents whilst operating them.

2.5 WORKPLACE ENVIRONMENT

The physical workplace environment is described as the 'physical location of the place where work is performed, job itself and organisational culture. It is a combination of the human, technical and organisation itself' (Yusuf & Metiboba, 2012). Within the work environment, people interact with each other, with management and equipment that they use to perform their duties. All these within the work environment influences the morale, adherence to safety rules, and productivity of workers (Yusuf & Metiboba, 2012).

2.5.1 Impact of work environment

A work environment that poses health risks to workers compromises their ability to adhere to safety and health regulations, and results in low production and job commitment (Raziq & Maulabakhsha, 2015). Factors that could compel workers to perform better and be more productive were identified as hygiene and motivation. Occupational hygiene factors include the evaluation of working conditions, and control of identified hazards. The quality of supervision and relationships amongst and with fellow workers, including those in management, also motivates workers to perform better.

Motivation factors are those factors where workers feel accepted at work, being allowed personal growth, and workers understanding their role at work (Baah & Amoako, 2011). Due to complex working environments, the well-being of workers should be taken care of (WHO, 2009). Workers' well-being is determined by whether they are satisfied or not (Lee, Park, Min, Min, Hwang, Leem, Kim, Jeon & Moon, 2014) and if these factors are not

properly handled in the workplace, workers could display poor psychological symptoms, which may lead to poor work production.

Both hygiene and motivation factors were found to be the leading causes of low production in the Bangladeshi garments industry, with hygiene factors taking the lead (Saha & Mazumder, 2015). A work environment that is not properly organised affects workers' psychological well-being. Armstrong, Punett and Ketner (1989) identified stress, the work environment, and repetitive work as the leading causes of most accidents in Malaysian industries because workers were not entirely satisfied with their work. Human error accounted for most accidents in the manufacturing industries in this country (Armstrong, Punett & Ketner, 1989).

Lee et al. (2014) also indicated that workers' satisfaction accounts for good performance but dissatisfied workers are unable to perform. A safe work environment motivates workers to be more alert and more productive (Abugre, 2014). Although Ushie, Agba Ogaboh and Chimaobi (2015) disagreed that incentives at work can act as a motivational factor, they emphasised that the work environment should be a priority for the health and safety of workers.

2.5.2 Workplace design

The design of the workplace influences the way workers perceive their work, which in turn affects the way they perform their duties. In the process of trying to achieve the goals of an industry, a work environment that is not well designed could lead to poor performance (Vischer, 2008). The physical work environment should be comfortable for workers in order for them to adjust their abilities to the demands of the work. It is vital to have a physical work environment that satisfies the workers and does not present workers with high demands (Vischer, 2008).

Workers whose lower level requirements (physiological needs) are met are able to elevate themselves to the psychosocial level. The physical comfort fit level addresses what Maslow regarded as physiological needs, but within the physical comfort fit level are security needs and the sense of belonging of workers.

Once workers start viewing the physical work environment as satisfactory, they start to develop a feeling of acceptance. They then become mentally elevated to the psychosocial comfort fit level where they start to embrace their work. A feeling of ownership of the workplace emerges, which increases productivity and decreases occupational accidents (Hyrkkänen & Nenonen, 2011).

2.6 OCCUPATIONAL HAZARDS IN THE MANUFACTURING INDUSTRIES

Hazards in the workplace occur in different forms and once workers are exposed to hazards they could either be injured, get sick or even die (Aliyu & Shehu, 2006). Exposure to hazards happens when a worker comes into contact with any hazardous substance. Hazardous substances are classified according to the way they present themselves in the workplace; that is physical, chemical, biological, mechanical and psychosocial. The type of injury, the body part affected, and the source or event all determine exposure and health effect of a hazard (Sokas & Sprince, 2017).

2.6.1 Physical hazards

Physical hazards are those hazards found in the physical work environment. Workers experience physical hazards through contact; however, in most cases workers become exposed without touching them (Thygerson, Sanjel & Johnson, 2016). Examples of physical hazards existing in the manufacturing industries include noise, illumination, vibration and extreme temperatures.

2.6.1.1 Noise

Jhanwar (2016) defines noise as an ‘unwanted sound and unnecessary form of energy which is emitted by a vibrating body and on reaching the human ear causes the feeling of hearing through nerves’. Exposure to noise happens as workers use tools and machinery for cutting, grinding and/or drilling. Some of the machinery used for production of goods emit sounds that could affect workers.

The acceptable workplace limit for noise is 85 dB and exposure to noise that is above the required limit of 85 dB could lead to noise-induced-hearing-loss. Exposure to noise in the workplace could be controlled by using equipment that has been engineered to operate quietly, and installation of noise-proofs around noisy areas. In some instances, noisy equipment could be substituted with one that is less noisy or impact minimised by supplying workers with protective clothing like earplugs or hearing muffs (WHO, 2010).

2.6.1.2 Illumination

Illumination is the intensity of light that falls on a surface and is measured in lux (OHSA, 1993). A workplace that is too bright or too dim exposes workers to eyestrain. This is evident in workers who were exposed to lower levels of light who displayed signs of mood shifts, as compared with workers who were exposed to higher levels of light (Veitich, 2011). Fatigue and eyestrain are other symptoms induced by insufficient lighting in the workplace (Mills, 2016). Workers should perform their duties in a well-illuminated area, as specified in the Environmental Regulation for Workplace Schedule (Machinery and Occupational Safety Act, 1983).

2.6.1.3 Extreme temperatures

Every workplace exposes workers to extreme temperatures, either too cold or too hot. Extreme temperatures could lead to illnesses in workers and proper protective equipment is recommended (Acutt & Hattingh, 2011). Symptoms of extreme temperature exposure are heat stroke, heat stress, heat exhaustion and hyperthermia. Workers working in sections that are too hot must be advised to increase intake of fluid. They should be physically fit to work under extreme heat conditions. Workers who are exposed to very cold working conditions have a likelihood of hypothermia and proper protective equipment, physical fitness and frequent rest periods are recommended.

2.6.1.4 Vibration

Vibration is the oscillatory motion occurring when there is an alternating movement in one direction and then velocity in the opposite direction (Guild, Ehrlich, Johnson & Ross, 2001). This oscillatory motion happens frequently and with intensity.

Vibration mostly happens when workers use machinery and equipment that produces repetitive movement like jack hammers.

Although the use of vibrating machines and equipment affect workers differently, health effects depend on the frequency, duration and the type of machinery or equipment used. Too much exposure to vibration leads to either hand-arm vibration syndrome or whole-body vibration syndrome. The solution to vibration exposure could be engineering of vibration equipment and machinery that absorb the pressure before reaching a worker and the use of thick gloves (Singh & Khan, 2014).

2.6.1.5 Chemical hazards

Most chemicals arising from the manufacturing industries are dust due to grinding or blasting of rocks and stones, the production and packaging of bricks, and coal dust during the drying of bricks in kilns. Some chemical hazards are in the form of fumes or gases like carbon monoxide and sulphur dioxide that are released once coal is burnt.

In other manufacturing industries chemicals are used for the production of household detergents. Once workers become exposed to chemical substances the routes of entry into the body are inhalation, absorption and ingestion. Depending on the dose and frequency of exposure, chemicals could cause skin disorders or in some cases damage could be caused to human internal organs (Acutt & Hattingh, 2011). Employers need to ensure that they follow the correct acceptable exposure limits and protect workers who are working with or are exposed to chemicals.

2.6.1.6 Mechanical hazards

The most common hazards in the manufacturing industries are mechanical hazards. These type of hazards are referred to as any moving machinery, tools, equipment and plant that could cause harm to a worker when performing work or when coming into contact with power transmitters on the machine or any of its moving parts.

Some of the injuries that occur due to mechanical hazards are being punctured, being hit by an ejected part of a machine, or being caught by moving parts (entanglement). For the South African manufacturing industries, Regulations for General Machinery (1988),

Electrical Machinery (1990) and Driven Machinery (1992) offer guidance on the safety precautions of workers.

2.6.1.7 Psychosocial hazards

Psychosocial hazards happen when workers are exposed to traumatic events that could cause stress and depression. The major causes are workload, harassment, bullying and lack or unfair distribution of resources at the workplace. The health outcomes of psychosocial hazards are depression, stress and Musculoskeletal Disorders (MSD) (WHO, 2010). Management relationships with workers, clearly defined job roles, availability of resources, and a well maintained workplace; including work stations, are recommended to either prevent or minimise psychosocial hazards at the workplace.

2.7 COMPLIANCE TO HEALTH AND SAFETY REGULATIONS IN INDUSTRIES

2.7.1 Introductory sentence

Occupational health and safety regulations serve as a guide to both employers and workers regarding how to ensure a workplace that is safe and healthy. To ensure a safe and healthy workplace in manufacturing and other industries, both the workers and their employers should comply to safety regulations as stipulated in their workplace health and safety policies.

2.7.2 Theories related to Health and Safety

Occupational health and safety theories are developed as a way of assisting industry stakeholders like managers, workers and manufacturers of raw materials, to improve health and safety. Stakeholders are able to measure their workplace health and safety strategies against the theories, in order to minimise occupational accidents and maximise production (Mattila, Hyttinen & Rantanen, 1994). Health and safety theories by Haslam and Haslam (2000) and Green and Kreuter (1991) that advise on the identification of challenges in the workplace and development of programmes are discussed below.

A stage specific theory that aimed at improving occupational health and safety was developed by Haslam and Haslam (2000). This theory focuses on stages of change that should be applied in the workplace to ensure that occupational hazards are reduced. The four stages are behaviour change by stakeholders, plan of action, acting against identified challenges and maintaining the standards that an industry has developed in mitigating occupational hazards (Haslam & Haslam, 2000).

It is vital to recognise the purposes of different stakeholders in industries before designing and implementing any workplace health and safety interventions. Interventions should consider behavioural changes of workers towards health and safety and relevant information should be gathered first.

The gathering of information requires identification of systems that might fail the management system (Green & Kreuter, 1991) like the current state of the working environment. Once information is gathered skills training should be offered to all stakeholders (Haslam & Haslam, 2000). For these intervention to work all stakeholders should be ready to change their approaches towards health and safety.

The health promotion planning model by Green and Kreuter (1991) was developed as a step towards reducing occupational accidents. Previously, more emphasis was placed on workers behaviour, attitude and beliefs (Cox & Cox, 1991) without much attention being given to the working environment itself (DeJoy, Wilson & Huddy, 1995). The Health Promotion Theory by Green and Kreuter (1991) focused on safe protection behaviour for workers through the use of three sets of behavioural factors.

The three sets of behavioural factors are:

- Predisposing factors which focus on the confidence, knowledge, attitude and beliefs of workers towards health and safety. These factors determine the extent to which workers strive to accept or improve their health behaviour based on the working environment.
- Enabling factors focus on the conditions of the work environment that could hinder good behaviour at work. This includes the skills and knowledge that workers have,

availability of protective equipment and the provision of a workplace that does not endanger their health and safety.

- The reinforcing factors are rewards, acknowledgements towards workers' contributions and disciplinary measures taken against violations in the workplace.

It is against this background and the reported escalating occupational accidents in the manufacturing industries of the Polokwane municipality that intervention is required. Intervention strategies require information on workers' conduct, workplace survey and the readiness of stakeholders to change the state of affairs in the manufacturing industries. The development of a training programme will therefore be based on information gathered using the two strategies.

2.7.3 Compliance to health and safety regulations in the manufacturing industries

Occupational Health and Safety legislation and policies are used as guidelines and monitoring tools for health and safety in the workplace. Sometimes organisations have the best health and safety policies but still record the highest number of occupational accidents (Nahrgang, Morgeson & Hofman, 2011). This could be attributed to some deviations as indicated in a study conducted by Tangkittipaporn and Tangkittipaporn (2006) in Thailand. This study reported that lack of supervision was linked to occupational injuries, as the government was allowing community members to work from their homes as a way of reducing unemployment.

In Spain, the majority of industries were reactive to occupational accidents and the approach was not encouraging the employers to reduce occupational accidents, prompting the government to pass the Spanish Law of Prevention of Labour Risks in 1995 (Sese, Palmer, Cajal, Montaño, Jiminez & Llorens, 2002). The act focussed holistically on health and safety in the workplace. It offered both the employers and workers an opportunity to view prevention of occupational accidents differently.

Sese et al. (2002) considered legislation, organisational structures and the work environment in order to understand how industries comply with safety issues. Their approach towards the study ensured that the results were reliable.

In Saudi Arabia, there are a number of challenges with regards to health and safety in the workplace. The number of industries in the Kingdom grew rapidly from 1990, but lack of proper health and safety legislation hinders the ability of those trying to prevent occupational accidents. The number of accidents in the workplace increased in most industries in the last two decades. There is still no clear policy on how health and safety compliance officers should be appointed and how the training of occupational health and safety specialists should be done in the country (Noweir, Alidrisi, Al-Darrab & Zytoon, 2013).

A study by Papadopoulos, Georgiadou, Papazoglou and Michaliou (2010) that sought to find out how occupational and public health and safety in Greece could be applied in the changing work environment, raised questions relating to legislation. It was found that there was a lot of under-reporting of occupational accidents and near misses. Legislation requires employers to report any accidents in the workplace, including any near-miss. Compliance and enforcement legislation assist both the employers and workers to improve health and safety at work through continuous risk assessment processes and further training in health and safety (Niskanen, 2013).

In Finland, both the Occupational Safety and Health and the Occupational Health Services provide guidance on how occupational health and safety should be carried out. Both the employers and workers are offered responsibilities to ensure that health and safety is improved and maintained (Anttonen & Páakkonen, 2010). The enforcement of the legislation and services provided much needed assistance as more workplaces were inspected for health and safety using quality inspection by the year 2012 (Anttonen & Páakkonen, 2010).

In the United Kingdom, the Health and Safety at Works Act (1974) was passed to guide both employers and workers but goes further to include the producers and suppliers of any item that is consumed by members of the community.

This was to ensure that, besides producing safe and quality products, products should be produced under conditions that do not expose employers and workers to unsafe acts (Russ, 2011). It is the duty of line managers to ensure safe conduct in the workplace and then pass on the safety information to their colleagues (Fleming, 2000).

Proper implementation of health and safety programs has shown to improve the health and safety of workers. Top management commitment and the involvement of other sections or divisions within the workplace yield positive health and safety results. The feeling of involvement in decision-making is linked to reduced injuries, diseases and deaths in the workplace (Havlovic & McShane, 2000).

Different regulations to monitor compliance to health and safety in the workplace were passed in countries like Turkey, Australia, England and Italy. Despite these efforts to reduce occupational injuries, different companies still continue to record high numbers of workplace injuries, diseases and deaths (Driscoll & Fingerhut, 2008).

Worldwide it is estimated that 264 million accidents are reported annually, with a quarter of a million resulting in deaths (Rahmani, Khadem, Madreseh, Habib-Allah, Raei & Karchani, 2013). Most of these reported cases are caused by unsafe workplace accidents and lack of safety knowledge and non-compliance to safety regulations (Nenonen, 2011).

2.8 SAFETY MANAGEMENT SYSTEM

Lack of safety culture and non-compliance to the Occupational Safety and Health Act were found to be contributory factors towards the high accident rate in the manufacturing industries of Malaysia (Amirah, Asma, Muda & Amin, 2013). These were the findings of a study investigating how occupational accidents could be combated through a safety culture because most company owners did not comply with the country's legislation regarding safety and health.

Although there is legislation and different policies that were passed worldwide to guide health and safety standards in the workplace, these alone cannot reduce occupational accidents if management commitment is not guaranteed. One of the contributors to occupational accidents has been identified as human behaviour.

Workers only change their behaviour at work if employers apply justice to all equally. Job satisfaction, including the cognitive element, is key in addressing some challenges relating to causes of accidents in the workplace. A study conducted amongst Pakistani workers to investigate the relationship between organisational justice and workers' outcomes revealed that organisational justice should be adhered to in order to maximise workers' performance (Zaman, Ali & Ali, 2010). In most cases, there is pressure on organisations due to time frames related to the completion of projects, budget constraints and client demands, such that compliance to occupational safety is compromised.

Management that cares for the health and safety of their workers should show shared vision regarding investment in such programmes (Neal & Griffin, 2000). In Texas, USA, management failure to follow proper risk assessment procedures at the oil refinery led to a fatal accident where 7 people died and 150 were severely injured (Kalantarnia, Khan & Hawboldt, 2010). Kalantarnia et al. (2010) used risk assessment model that describes how accident analysis is done and had those responsible at BP Texas followed the model the accident might have been avoided.

Safety management systems were first introduced after the Second World War. Before then health and safety issues in the workplace were addressed in a disjointed manner. It was only after the war that larger industries combined their efforts to have a clearly defined occupational health and safety system (Hohnen & Hasle, 2011). A well-developed safety management, combined with a comprehensive safety culture, could reduce occupational accidents and yield positive safety results in organisations (Zubaidah, Samad & Zakaria, 2012).

The way management handles safety issues in the workplace is key to safety compliance and conduct of workers. That is done through a well-defined safety management system with continuous workplace surveillance, monitoring and offering of support to workers (Törner & Pousette, 2009). Comprehensive information regarding the high safety standards at the workplace was obtained through interviewing all categories of the workforce. The sample was also a true representation of the study population.

Management should always offer safety leadership in any workplace. This could include training, coaching, provision of PPE (Ismail, Doostdar & Harun, 2012) and proper hazard identification and risk management (Wurzelbacher & Jin, 2011). Failure to offer safety leadership proved fatal in the olive mills of Spain, the world's leading olive producer. One in every three olive mills used an outsourced company to manage their health and safety program, which led to lack of safety information among workers regarding risk identification and how occupational accidents happen (Pajero-Moscoso, Rubio-Romero, Perez-Cantos & Soriano-Serrano, 2013). The method of data collection used by the authors might have compromised the quality of the results because they visited the industries prior to the study and then designed a questionnaire which might have led them to expect certain responses.

2.9 AGE, WORK EXPERIENCE AND WORKERS' BEHAVIOUR

Kumar, Rathnakar and Kumar (2010) indicated in their study that age and work experience are contributing determinants of accidents in the workplace. In their study conducted amongst tile manufacturing factory workers in Mangalore city, it was found that inexperienced workers or those who had worked for less than 5 years accounted for most accidents in the workplace, with younger, inexperienced workers being in the majority.

Almost similar findings were reported in a retrospective study done in the city of Ankara, Turkey amongst patients who worked in construction and manufacturing industries. Patients' files were used to gather information and younger males who had worked between 1 and 5 years accounted for most occupational accidents. Most occupational injuries occurred amongst workers between the ages 26 and 35 (Celik, Yilmaz, Kavalci & Yel, 2013). Kumar et al. (2010) reported on three tile manufacturing factories out of the six in the city of Mangalore. The authors could have used all six tile factories in order to have a representative sample and then used stratified sampling in order to ensure that the generalisation of their results is justified.

In the metal smelting industry in India it is reported that inexperience and age, amongst at-risk groups, also contributed to major occupational accidents. The aim of the investigation was to determine the types of occupational accidents in the industry and how they occur amongst workers (Saha, Kumar & Vasudevan, 2007). Accidents reports and workers' records over a period of 5 years were used to collect information for the study and some of the workers were interviewed. Saha et al. (2007) tried to spread their data collection strategy by investigating all factors that could cause occupational accidents. They focused on the day an accident happened, events leading to an accident and tools that were used prior to an accident, which validated their results.

Cox, Jones and Rycraft (2004), in a study on employees' behaviour and occupational accidents, differ with Celik et al. (2013) and Saha et al. (2007) on whether age and experience are determinants of occupational accidents. They conclude that most accidents are caused by the conduct of workers and more emphasis should be placed on workers' conduct. This could be achieved through continuous monitoring of the workplace stations by employers.

Continuous monitoring is reported to increase safety conduct and confidence among workers. Workers who feel involved in their daily work develop a sense of belonging and are highly motivated, more productive and careful and behave in a manner that promotes safety in the workplace (Paul & Maiti, 2008). Failure to adhere to health and safety regulations in the workplace lead to injuries, diseases or death in extreme cases. Deaths emanating from different workplaces wee higher than infectious diseases or even child mortality around the world (Hamalainen, Takala & Saarela, 2007). Most injuries, diseases and deaths in the manufacturing industries are caused by either negligence, lack of knowledge on how to apply health and safety rules, or occupational stress.

Continuous injuries on duty, diseases or deaths impact negatively on the economy and could also lead to health problems like stress or even negative attitudes towards the workplace itself with company resources negatively affected due to sick leave, absenteeism and compensation claims (Tadesse & Admassu, 2006).

Although most studies focus on age, experience and defective equipment as the cause of occupational accidents, there are chains of events that could lead to occupational accidents. In analysing accidents, employers and compliance officers miss the sequence of events leading to an accident, starting from workers themselves to the condition under which the work is carried out, the type of work and the resources available to perform their duties (Cooper, 2001).

2.10 HEALTH AND SAFETY AMONG WORKERS IN AFRICA

Compliance with health and safety issues is also a challenge on the African continent but Jauhanger (2012) emphasises the importance of health and safety education and training among workers. In his study on Occupational health and safety in Mauritius, the author reported that more workers in the country are practising as health and safety officers to ensure safety in their workplaces. Workers are empowered through the country's safety and health legislation to enrol for further training with the assistance of their labour unions.

The Mauritian government is ensuring that even the general population is made aware of health and safety and the role that should be played by communities in health and safety. One of the most dangerous workplaces identified by ILO (2006) worldwide is the fishing industry. This industry is estimated to account for less than a percent in terms of employment figures due to its size but has the most severe injuries (Le Bouar & Chavin, 2006).

In a study conducted in the fishing port of El-Maddiya, Egypt where a total of 686 fishermen were interviewed, it was reported that symptoms such as poor vision, hearing and musculoskeletal disorders were major health problems among workers. Some reported occupational injuries caused by falling, being struck by objects and slippery surfaces of the vessels (Zytoon, 2012). To ensure accuracy of data the author limited questions to events that were not older than 3 years, thus reducing recall bias, which makes the investigation acceptable.

According to Katula (2013) in a study on preventive occupational safety and health culture, lack of inspection in Uganda led to the death of 11 workers. Where inspection is done supervisors lacked knowledge on building work.

As in Uganda, Botswana ‘s improperly trained personnel, minimal inspection by authorities and vague regulations are reported to be responsible for most occupational accidents. The industry exposes workers to dangerous working conditions and that poses a threat to their health and safety in the workplace (Mosanawe, 2013).

Age and workers’ dissatisfaction are reported to be the major causes of industrial accidents in Ghana. A study amongst mining, textile, wood-processing and brewing workers on the perception of workers on workplace safety revealed that those who worked in areas with high occupational accidents perceived poor safety measures and lack of management commitment as being responsible for the accidents. Most accidents were reported among the 16-26 age groups (86%) of the 129 participants in the study. In contrast, workers identified as working in areas with lower accident rates indicated job satisfaction in the same study (Gyekye, 2006).

Gyekye (2006) tried to include all categories of workers and industries and generalisation of the results is justified. Long working hours accounted for about 825 occupational accidents between the year 2007 and 2008 in Gabon. A study that was conducted among woodworkers in the country found that pressure to complete work and long working hours were the main factors accounting for accidents in the city of Libreville. Workers had to work for 12 hours per day with fewer breaks, leading to occupational stress. Due to lack of risk assessment conducted on site, occupational hazards were not identified (Comlan, Ezinah, Mouanga & Obiang Ossoubita, 2009).

In the cotton-spinning industry in Zimbabwe it has been reported that both ergonomics and ageing equipment are major causes of occupational accidents. Though the industry has modern equipment, very old equipment is still being used to perform some duties. Most of the workers there are still manually handling sacks and sometimes carry a load of up to 200 kilograms resulting in frequent bending and twisting of the body.

Manual work also includes cutting of wires using clippers, resulting in workers cutting their faces and upper body (Mutetwa, 2005). Employers are encouraged to use PPE, but only as a last resort in their workplaces. Much effort should be focused on ensuring that the workplace is safe and free from any hazards (OHSA, 1993).

In a study to determine knowledge, attitude and practices regarding the use of PPE among sawmills employees by Magoro, Malema, Kekana and Mothiba (2013), it was reported that most of the employees were not using PPE even though it was provided to them.

2.11 TRAINING PROGRAMME DEVELOPMENT

According to Vredenburgh (2002), human error due to lack of safety training is a major cause of occupational accidents. It is vital for industries to have safety training to assist workers to identify potential accidents on time.

In a study conducted amongst hospital workers on organisational safety Vredenburgh (2002) reported that continuous monitoring and evaluation of training programmes assists workers in reducing occupational accidents. Kiani, Samavtyan, Poorabdiyan and Jafari (2012), in a study to investigate safety training and its effects among workers, concur with Vredenburgh (2002) and further indicate that training of workers increases alertness, improves workers' attitudes towards safety at work, and reduces the level of stress.

In a study on how hazards and safety training influence learning and performance, Burke, Salvador, Smith-Crowe, Chan-Serafin, Smith and Sonesh (2011) found that knowledge regarding hazard identification and how to handle safety issues improves workers' performance. For a training programme to be developed much emphasis should be placed on the needs of a particular industry. Task analysis and the design and development of the training program should be considered (Kulkarni, 2013). This is due to the fact that industries with higher exposure to hazards have higher safety training engagement as compared to those with fewer exposure rates who engage less in worker training programmes (Burke et al., 2011).

Task analysis involves defining the target population, tasks to be performed, and skills to be taught. Within design and development, there should also be indication of the way training will be done, the duration and how evaluation is going to be done to test if the program is suitable for the targeted workers (Kulkarni, 2013).

2.12 CONCLUSION

This chapter on the literature review focused on the causes of occupational accidents in relation to work conditions in the manufacturing industries of the Polokwane municipality. Reviewed sources of information regarding global workplace regulations in industries and International health and safety standards were discussed and linked with what may be the causes of occupational accidents in the manufacturing industries in the Polokwane municipality. Different causes of occupational accidents in industries were highlighted and the severity of occupational accidents indicated, globally and locally. Causes of occupational accidents from literature indicated that this is not only a problem in the manufacturing industries of Polokwane but is a global challenge.

The next chapter deals with the Methodology that was applied during the investigation of the manufacturing industries in the Polokwane municipality.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

The previous chapter reviewed literature that described the magnitude of occupational accidents in different industries. This chapter focusses on the methodology that was used to assist the researcher to answer the research question and achieve the aim of the study. The methodology includes study design and methods, study site, population and sampling, data collection and analysis.

3.2 RATIONALE FOR THE RESEARCH

The researcher wanted to develop a training programme to assist prevent occupational accidents in the manufacturing industry of the Polokwane municipality, followed by the development of a training program that could assist in either preventing or minimising and controlling occupational accidents.

3.3 STUDY SITE

A study site is a geographic location where the study was conducted. It gives a reader an idea of the location of the study participants. The study was conducted in five categories of manufacturing industries offering services in the Polokwane Municipality, Capricorn District, Limpopo Province. The categories of industries were clothing and textile, brick manufacturing, iron and steel, chemical processing and wood processing.

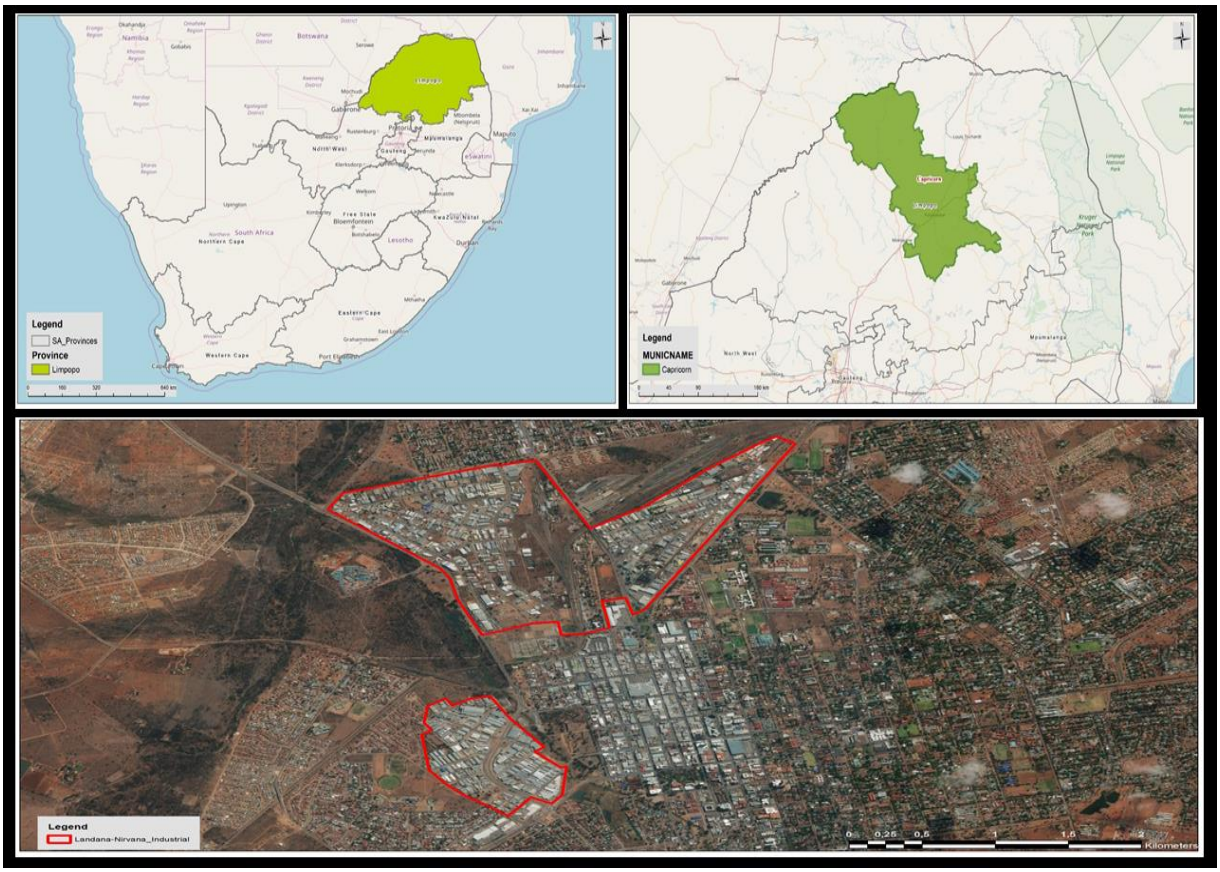


Figure 3.1: Map showing study site: Source (Angie Ntsala Graphics, 2017)

3.4 RESEARCH METHOD AND DESIGN

Research methodology is defined by Goddard and Melville (2004) as a way of finding out the results for a given problem that relates to a research question. A research design is a structure that indicates how data will be collected, measured and analysed. It specifies the approach and strategy that will be used in a study (Kothari, 2004). The current study applied a qualitative research method where the researcher collected data using interviews, observations and evaluation of manufacturing industries' health and safety training programmes.

A qualitative method is a strategy that is applied to mixed study components with the purpose of answering the research question (Creswell & Clark, 2011). The research question of the study was '**What are the causes of occupational accidents in the manufacturing industries of the Polokwane municipality**' and this method, through the use of unstructured interviews and the evaluation of health and safety programmes, assisted the researcher to focus on what needed to be achieved. Probing questions were asked when the researcher needed clarity or more information. This section on methodology has an influence on the quality of data to be collected. A qualitative method provides results that are usually rich and detailed, offering ideas and concepts to inform research (Creswell & Clark, 2011).

3.4.1 Research Methodology

Research methodology is a process that a researcher uses towards solving a problem and to study ways of conducting research. It guides a researcher on how to undertake a study through describing, explaining, determining and investigating a phenomenon (Creswell, 2014).

3.4.1.1 Qualitative Research Method

A qualitative method assisted the researcher to provide an in-depth investigation regarding a crucial issue (Jamshed, 2014), which is detailed and natural according to the participants' viewpoint (Dörnyei, 2007). Researchers using qualitative methods go into the field where the action is being performed in order to be closer to people and their surroundings (Patton, 1990), using systematic interactions with humans to gain an understanding of their experiences (Grove, Gray & Burns, 2015). Qualitative research uncovers more about individuals' experiences, how and why certain events unfolded through the use of language, and observations of individuals' behaviour (Silverman, 2015).

The advantages of using a qualitative research methodology for this study is that it pays a lot attention to individual cases with more emphasis focused on social meaning and how individuals are affected. The researcher interacted with managers, supervisors and workers in the 13 manufacturing industries of the Polokwane municipality.

The researcher visited 13 manufacturing industries in the Polokwane municipality to collect data through interviews, review of health and safety programmes, and observations of both workers and their physical work environment. The method of interacting with participants through interviews provided insight on to how people feel and think (MacDonald & Headlam, 2009).

3.4.1.2 Data collection

In this study, face-to-face interviews were conducted with managers, supervisors and workers. Each interview lasted for at least 30 minutes and participants were interviewed at their workplace. The central question formed the core of the questions asked. Each participant was interviewed separately in a room where there were no disturbances and participants were free to relate their experiences regarding occupational accidents at their respective workplace.

In addition to the interviews, the researcher also conducted walk-through workplace unstructured observations using a checklist (**Appendix E**). Unstructured observations allow a researcher to identify and describe certain behaviours and events as they happen (De Vos, Strydom, Fouché & Delport, 2011). A checklist was used to evaluate whether certain characteristics existed in a phenomenon under investigation. A checklist assisted the researcher to focus on areas within the workplace that were high risk and had the potential to cause occupational accidents. On the checklist the researcher had a category of characteristics that was used to identify potential causes of occupational accidents. There are various types of checklists and one of the types, as described by Scriven (2007), is the laundry list. Scriven (2007) describes a laundry list as a set of categories where the researcher chooses certain aspects and investigates whether they exist or not.

The third method that the researcher used was a review of the training programmes obtained from industries that used them to train their workers. The review was guided by the OSHA (1989) guidelines (**Appendix D**). By using the three data collection methods, issues related to occupational accidents in the manufacturing industries of the Polokwane municipality emerged.

The study applied three phases, namely Phase 1 (Research design), Phase 2 (Training programme development) and Phase 3 (Validation of the training program).

3.4.2 Phase 1

An exploratory, descriptive and contextual design was used for the study as a way of answering the research question.

3.4.2.1 Exploratory research design

Exploratory studies aim to uncover significant information from a study population by determining the nature of the problem (Brink & Wood, 1998). This method was used to uncover the causes of occupational accidents in the manufacturing industries of the Polokwane municipality, which were reported to be on the rise during the years 2012-2014. An exploratory study helped the researcher to understand issues more thoroughly by searching for new knowledge, meaning and understanding related to the population of interest. New knowledge, its meaning and understanding was sought through interviews, unstructured observations and review of health and safety training programmes by the researcher (Brink & Wood, 1998). The researcher observed workers as they were executing their duties and also observed the physical work environment of each of the selected manufacturing industries.

Furthermore, the researcher used the exploratory method to evaluate health and safety training programmes for information that each health and safety training programmes has. Lastly, potential causes of occupational accidents amongst the manufacturing industries were explored through face-to-face unstructured interviews with workers, managers and supervisors. The researcher preferred the exploratory method to gain information and to discover new ideas (Brink & Wood, 1998) regarding the possible causes of accidents in the manufacturing industries of the Polokwane municipality.

3.4.2.2 Descriptive research design

A descriptive study describes a phenomenon from participants who have experienced it directly or by being directly involved in understanding how events unfold at a particular setting. Descriptive studies further try to determine and describe the characteristics of a

phenomenon without the researcher tampering with the environment. Researchers are able to uncover and produce rich information through this method (Hammersley, 2007).

For this study, the researcher used this method because it was able to integrate information from both qualitative and quantitative data collection methods. The method enabled the researcher to unpack the prevailing work-related issues that could have led to occupational accidents in the manufacturing industries of the Polokwane municipality.

The researcher conducted face-to-face unstructured interviews with participants in the manufacturing industries of the Polokwane municipality, reviewed health and safety training programmes, and conducted a walk-through observation within the thirteen manufacturing industries. For this study, the descriptive method was suitable because a description of the experiences of workers in high risk areas in the manufacturing industries was required.

3.4.2.3 Contextual research design

A contextual method is a research method that helps the researcher to understand participants and the environment to be studied (Polit & Beck, 2010). This method assisted the researcher to locate the study at its original setting by visiting selected manufacturing industries. These manufacturing industries were selected because they reported the most occupational accidents during the years 2012-2014. In this study, unstructured interviews and evaluation of workplace health and safety programs were used for collecting data.

The research was conducted at the workplace where participants perform their duties daily. Since this was their natural setting (Brink, Van Rensburg & Van der Walt, 2006), the researcher could not manipulate the environment and participants who had knowledge regarding the workplace and how the job is performed were free to participate. The natural environment of participants is important as they are able construct their own meaning of events within their own setting (Miles, Huberman & Saldaná, 2014).

This phase focused more on the evaluation of health and safety training programmes through exploration as a way of finding answers to the question ‘what are the causes of occupational injuries in the manufacturing industries of the Polokwane municipality?’. It

also described the factors leading to occupational accidents and the development of a health and safety training program for manufacturing industries in the Polokwane municipality with regards to the prevention of accidents. Evaluation of health and safety training programmes, which is based on the OSHA (1989) guidelines, is discussed in detail under Data Collection (3.8).

3.5 STUDY POPULATION

Study population is the entire group in a specified location with characteristics that match the objectives of the study and to which the researcher would like to generalise the results (Polit & Beck, 2010).

The population for the study were workers in all five identified categories within the manufacturing industries of the Polokwane municipality. Amongst the selected participants were managers, supervisors and workers who were neither managers nor supervisors. The total number of industries visited were thirteen with a combined total workforce of approximately 800. This population is regarded as a true representation of workers within the manufacturing industries of the Polokwane municipality since they worked in the high risk areas of the industries and had experienced some occupational accidents whilst working there.

3.6 SAMPLING

Sampling is the selection of a representative group from a study population. A purposive sampling method was used where the different manufacturing industries and individuals were selected with the sole purpose of trying to understand the occurrence of events.

Purposive sampling methods are used to identify and select participants that are especially knowledgeable about or have experience with a phenomenon of interest (Creswell & Plano, 2011). Purposive sampling ensures that the researcher conducts an in-depth study with cases that are rich in information. It is through this sampling method that participants who are able to provide required information are selected (Green &

Thorogood, 2013). Supervisors, safety representatives and workers, who were not supervisors or safety representatives, from the different manufacturing industries were included in the study.

Of the thirteen manufacturing industries, each category was included in the study to ensure each category is represented. No sample size was calculated before the study due to the study design and method where numbers were determined by data saturation, which was based on the two categories of participants; managers and supervisors, and general workers.

Managers and supervisors were classified together because in all industries supervisors represent the aspirations of management and in some cases there were managers who were also supervisors. The workers were in a category on their own. A total of 22 participants took part in the study; 4 managers and 6 supervisors, and 12 general workers who were not supervisors or managers.

Participants were those workers who worked in high risk areas of the industry and had experienced an occupational accident at the workplace within the past years of being employed in each industry. The 22 participants were working in high risk areas in the selected manufacturing industries of the Polokwane municipality. The high risk areas where the workers were working were mostly in production and some in packaging/storage. Data saturation was reached during each interviews when new information was no longer being provided and the researcher found it proper to end the interviews.

3.7 SAMPLING ETHICS

Sampling ethics deals with the sampling techniques that a researcher applies when deciding on the sample for the study. The units that the researcher choose for the study should clearly indicate who to include or exclude and why. There should be a clear indication whether inclusion or exclusion of participants is based on theory or practical.

The purposeful sampling technique does not contain many ethical concerns since it is theory-driven and not practical (Pimple, 2008).

Apart from sampling techniques, sampling ethics focuses on the calculation of sample size to be used in the study. The purpose of sampling size ethics is to validate the use of over-sized or under-sized samples in a study. The two sample size errors could be used to justify the reason why the research question might have not been answered, due the size of the sample (Pimple, 2008).

The last ethical issue in sampling relates to gatekeeping; who is allowed to participate in the study and who is not. In most cases managers or those in leadership decide who should participate in a study for reasons known to them. It becomes an ethical issue when participants are selected by their leaders based on how they expect them to respond, this leads to information bias (Pimple, 2008).

Sampling of participants in the current study was done within acceptable ethics. Participants were selected according to their knowledge regarding health and safety and their experience within that field. Managers or leaders did not select participants based on the loyalty of workers towards them but based on their work experience and the high risk areas they were working in. No participant was included or excluded based on their sex, age or race. The use of a purposive sampling method, which is theoretically linked, ensured that no participant was unfairly selected for the study. Each participant completed a consent form (Appendix B) before the interviews commenced.

The sample size was determined by saturation and since all selected participants were knowledgeable regarding health and safety at their respective industries, ethical issues were not a concern because their views represented what was happening within high risk areas of their workplace.

3.7.1 Inclusion Criteria

Inclusion criteria is a method that is used for the selection of participants based on the research question. This method is done to avoid bias in the study and to ensure the researcher focuses on the study aim.

3.7.1.1 Inclusion criteria for health and safety training programmes review in manufacturing industries

Only manufacturing industries within the Polokwane municipality that had health and safety training programmes were included in the study with the purpose of reviewing the contents of the health and safety programmes.

3.7.1.2 Inclusion criteria for observation of manufacturing industry

All five of the categories of manufacturing industries; brick manufacturing, food and beverages manufacturing, wood processing and wood-related products manufacturing, household detergents production, and those producing material for road construction, were included. These are the categories of manufacturing industries in the Polokwane municipality. Some of the categories had more than one manufacturing industry and thus the total number of manufacturing industries across all categories were 13.

3.7.1.3 Inclusion criteria for interviews of manufacturing industries' workers

Only workers, managers and supervisors working in a manufacturing industry of the Polokwane municipality were eligible for selection to participate in the interviews for the study. It was only those workers, managers and supervisors of manufacturing industries who gave permission for the researcher to collect data at their industries who were selected to participate in the study.

3.7.2 Exclusion criteria

Workers, supervisors and managers who were not working in high risk areas, and those manufacturing industries within the Polokwane municipality that did not give permission to conduct the study, were excluded.

3.8 DATA COLLECTION

This section on data collection is linked to the research question: What are the causes of occupational accidents in the manufacturing industries of the Polokwane municipality, Limpopo Province? The objectives of the study; to evaluate health and safety

programmes, and to describe the factors leading to occupational accidents in the manufacturing industries of the Polokwane municipality, were used as guides on how data were collected. Thereafter a training programme was developed, validated by experts within the field of occupational health, piloted among university staff members and then implemented in selected manufacturing industries of the Polokwane municipality. Those who participated in the study assisted the researcher in identifying the causes of accidents in their different workplaces.

3.8.1 Methods used for data collection

For the study, three data collection methods were used. The three data collection methods were face-to-face interviews, observations and a review of health and safety training programmes in manufacturing industries of the Polokwane municipality.

The purpose of using the three methods was for the researcher to gain an understanding of the causes of occupational accidents in the manufacturing industries of the Polokwane municipality from three different angles and to answer the research question '**What are the causes of occupational accidents amongst manufacturing industries of Polokwane municipality?'**

Interviews are a comprehensive exchange of ideas between the interviewer and those interviewed with the purpose of eliciting information (Barbour, 2008). They are used when seeking the views and opinions of people with a specific perspective (MacDonald & Headlam, 2009). Questions that were formulated for the interviews were guided by a central question and subsequent questions were based on the responses of participants. Probing was done in order for the researcher to allow participants to clarify or explain more about their response.

Observations in research is a process where a researcher tries to understand the surrounding environment or the phenomenon under investigation. Researchers gather information, which is then processed and interpreted to give a clear meaning (Sapsford & Jupp, 1998) through watching, listening and asking questions (Mason, 2002). This data collection method assists the researcher to gather first-hand information.

For the workplace observations, the researcher used a checklist that was adopted from Bonell (2009) and some of the questions were aligned to the manufacturing industries of the Polokwane municipality that participated in the study. The checklist had four sections each with its own questions.

The researcher also reviewed health and safety training programmes of the manufacturing industries in the Polokwane municipality to assess the content and the type of training that is offered to workers. To review the health and safety training programmes the researcher used guidelines from OSHA (1989). A health and safety training programme is an action plan that is designed to prevent accidents at the workplace.

The contents of a health and safety programme include organisational goals, strategies, identification of hazards and their control. The development of a health and safety programme is usually a team effort that includes management, supervisors, workers and experts within the field of occupational health.

Data collected from each method complemented each other because the researcher was able to observe what was happening during work in the different industries, heard what workers, their supervisors and their managers said regarding occupational accidents that happened in their workplaces, and also reviewed their health and safety training programmes to determine what information was contained in the training programmes. The three different methods are described separately below.

3.8.1.1 Interviews

This data collection method assisted the researcher to capture information that might have been missed during observations. The researcher was able to lead the questioning (Creswell, 2014) in order to focus on the central question.

- Reasons for conducting interviews

Interviews are conducted with the sole purpose of exploring the experiences and views of participants in order for the researcher to reach a deeper understanding of the phenomenon being studied.

Interviews also assist the researcher to answer questions related to the investigation. Interviews offer insight and meaning from the perspective of participants' social and emotional experiences (Edwards & Holland, 2013).

The researcher used interviews for the study in order to gain first-hand information from participants and to expand on information gathered earlier using review of the training programmes from the manufacturing industries and observations. Information from the participants was vital because they had experience regarding the causes of accidents that they have experienced first-hand in their workplaces.

- Developing unstructured interviews

Unstructured interviews are used as a technique that follows a certain framework to address significant themes. It also assists the interviewer to be flexible (MacDonald & Headlam, 2009). Flexibility allows the researcher to change questions depending on the responses of the participant and also to probe deeper for more clarity (McLeod, 2014) without restricting the participants (Corbin & Morse, 2003; Dörnyei, 2007).

Although unstructured interviews might be time-consuming, they are able to assist the researcher to explore the phenomenon under investigation in-depth (Gill, Stewart, Treasure & Chadwick, 2008). This type of interview questioning requires that an interviewer be knowledgeable about the subject matter (Kothari, 2004) to ensure that accurate and reliable responses are obtained from the participants (Klenke, 2016).

One-on-one unstructured interviews were conducted with sampled individuals. They were conducted at their workplace, at the times that best suited them to avoid interfering with their duties. The interviews centred around the causes of occupational accidents that they had observed in their workplace.

- Probing questions

Probing questions are used as a way of getting more in-depth information after the questions have been asked; especially if the researcher finds a response to be too broad or unclear. The researcher asks for more clarity by requesting the participant to explain

more, this differentiates an interview from a normal conversation (Klenke, 2016). Probing questions were asked when a participant did not fully clarify the details of what was asked or where the researcher thought more information was required about the problem studied.

- The role of interviewer and the interview process

At the beginning of each interview the researcher welcomed the participant and explained to them their role in the study. The researcher listened to each participant carefully without interrupting them and ensured that each participant was offered full respect. The researcher did not display any emotions towards any of the participants' responses. Berg (2009) emphasised that it is important for the interviewer to focus more on the phenomenon at hand on not on personal issues.

Only managers, supervisors and workers who were working in high-risk areas and had experienced workplace accidents, incidents or near-misses were selected for the study. These workers were identified by their respective managers and supervisors after the researcher explained to the managers and supervisors who should be selected amongst their workers. All selected participants had knowledge of their workplace as they were identified by their managers and supervisors.

The purpose of conducting interviews was to get information regarding the participants' views on factors of training needs rather than assuming what they might know. Managers, supervisors and workers were interviewed and the interview assisted the researcher to gather relevant information related to health and safety in their different industries. Interviews were conducted either in English or Sepedi as the participants requested to use the language that they were most comfortable with so that they could express their views comfortably.

The central question for the interviews; which was "**Could you kindly describe the factors leading to accidents in your industry?",** was used as an introductory statement to let participants respond and explain the situation. After the first response, probing questions were asked so that the participants could clarify areas that needed

clarity in order to elicit more information about the problem studied. Each interview session lasted until the participants were no longer offering any new information. On average each interview session was 30 minutes long. Gibbs, Kealy, Willis, Green, Welch and Daly (2007) reported that once a participant is no longer bringing in new issues and keeps on repeating information, that is when data saturation is reached and the researcher has to stop with data collection.

At the end of the interview sessions the researcher thanked the participants for taking part in the study and asked each if there was something they needed to say or ask as guided by Talmy (2010)' s interviewing principles. A short debriefing session was held with each participant. Thereafter the researcher went through the recorded information to check if the recordings were audible and if there was a need for further interviews with the participants. Once the researcher was satisfied that the voice-recorder and recording were in good order each interview was labelled and transcribed. The transcribed information was then used for member checking and safely stored for at least five years in case data is required.

3.8.1.2 Observations

The researcher adopted a checklist from Bonell (2009) and modified it to suit the conditions of the manufacturing industries that were participating in the study. The modified checklist had four categories that were observed during a walk-through survey. Each category had approximately three to four questions, which had Yes/No response blocks where the researcher recorded observations that related to the question. The categories and questions did not differ much from what was reviewed from the health and safety training programmes and face-to-face interviews. This was because each of the three data collection tools complemented each other. The three categories on the observation checklist were protection of workers working at heights, the working area, and the use of PPE.

- Protection of workers working at heights

This category sought to reveal information relating to the protection of workers working at heights. Working at heights means workers who execute their duties working in elevated areas where there is an increased likelihood of accidents and falling to the ground.

- Working area

Another category that the researcher found to be relevant for the investigation of the causes of occupational accidents in the manufacturing industries of the Polokwane municipality was the working area. The working area is what is referred to as the physical work place where workers perform their duties. The purpose of this category was to find out if the physical work place at each manufacturing industry of the Polokwane municipality was safe and did not pose any danger to the health and safety of workers.

- Correct use of PPE

The last category on the checklist was to find out if workers were using PPE provided to them correctly.

3.8.1.3 Review of health and safety training programmes

Health and safety training programmes were reviewed as the third method of gathering information regarding the causes of occupational accident in the manufacturing industries of the Polokwane municipality. The review of the training programmes was guided by the OSHA (1989) document review guidelines. The purpose of including the review of the health and safety training programmes was to complement information that was gathered through interviews and industry observations. The researcher followed the guidelines from OSHA (1989) and the items that were reviewed in the training programmes were the following:

- Management commitment towards health and safety

The researcher wanted to determine how the health and safety training programmes outlined commitment by management regarding health and safety in the industry.

The health and safety training programme should indicate clearly what measures are in place by management to support health and safety in the industry.

- Involvement of workers

This item in the health and safety training programme should state the role that workers play in the development of health and safety policies in the workplace.

- Risk assessment

The researcher wanted to determine how the health and safety training programmes indicate that risk assessment is done at the workplace. It should also indicate who is responsible for which activities related to the identification of hazards, how exposure assessment is done and how risks are communicated in the workplace.

- Hazard prevention and control

The purpose of reviewing whether hazard prevention and control is included in the health and safety programmes of the manufacturing industries was to found out if there are guidelines for managers, supervisors and workers on how to deal with hazards in the workplace. This should be clearly indicated in the health and safety training programmes.

3.9 STEPS IN DATA COLLECTION

For the researcher, the process of data collection involves knowing where data will be collected from and the associated preparations. Collecting research data requires that the researcher consider ethical issues and build a relationship with prospective participants. Consideration of the study site is also important and who to consult in order to have access to the participants (Arthur & Hancock, 2007). It is unethical to enter a study site and collect data without permission from the relevant authorities. By consulting relevant authorities, the researcher will avoid collecting and publishing data that might be deemed private and sensitive (Oliver, 2010).

Ethical issues should be addressed at the initial stage of data collection where the researcher needs to explain the details of the study (Arthur & Hancock, 2007) and to justify what type of research is to be conducted (Oliver, 2010).

Before data was collected the researcher had to follow two steps to ensure that there were no pitfalls, either at the beginning, during or after the process of data collection.

The two steps that were followed were:

3.9.1 Request for data collection

The researcher visited thirteen different manufacturing industries in the Polokwane municipality with the purpose of requesting permission (**APPENDIX D**) to conduct the study. The thirteen manufacturing industries comprised of five different categories of manufacturing industries in the Polokwane municipality. The five categories were brick manufacturing, food and beverages manufacturing, wood processing and wood-related products manufacturing, household detergents production, and infrastructure products manufacturing.

After securing an appointment with management of all industries, a formal request that indicated the purpose of the study was sent. Some of the industries did not respond because they had to request permission from top management. Others did respond and allowed the researcher to conduct the study at a date that suited them.

3.9.2 Preparation for data collection

Study site preparation was done by visiting the different categories of the manufacturing industries in the Polokwane municipality to ensure that the researcher was familiar with the workplace environment where the interviews were to be conducted and to remove any distractions that may affect the interviews. Managers of different manufacturing industries were contacted and an appointment (**Appendix E**) was scheduled where the details of the study were explained to them.

The researcher informed the managers that at least 3 participants would be required to participate in the study and that they should be selected from workers who are familiar

with the industry, who have worked in the industry for at least two years, and who work in high risk areas. The three participants were selected from management, supervisors and general workers. A date for each interview was set and locations where interviews would be conducted were identified.

The researcher also had to prepare the site for data collection to establish rapport with industry management through pre-visits. This is to ensure that there is trust between the researcher and industry management and for the researcher to familiarise himself with the environment within the industry and to understand the requirements during data collection. This process ensured that relevant participants for the study were selected correctly and that industry management were briefed on what health and safety benefits there might be after the study is concluded.

During data collection the researcher ensured that participants were free to answer questions freely and without feeling intimidated. This the researcher did by assuring the participants that all information provided would remain anonymous, and that their information would be used to develop health and safety strategies that may help in preventing or reducing occupational accidents. Participants were also encouraged to seek clarity if any questions were not clear to them.

Data collection took approximately six months due to the availability of participants. For those industries that did not respond to the request and were not included in the study, the researcher used observations to identify occupational hazards based on the layout of the industry, workers' conduct and their supervision during work.

Evaluation of the training programmes, observations and one-on-one unstructured interviews were the methods used to collect data. The three methods of data collection are explained separately later on in this chapter.

3.10 DATA COLLECTION ETHICAL CONSIDERATION

The purpose, duration and ethical issues of the study were first explained to participants. Any doubts or fears that the participants had regarding the information that was collected were addressed to ensure that each participant participated in the study voluntarily.

Permission to record the interviews were sought from each participants and the purpose for using the voice-recorder; which was to ensure that no information was lost and that participants will be allowed to access the recordings thereafter (member checking), was explained.

During data collection the researcher ensured that the rights of participants and the study site were respected. The researcher ensured that no names of participants or their participating industries were revealed to anybody. Participants were informed of their rights to withdraw from the interviews if they felt that they were unfairly treated. Where a participant slipped and mentioned a name, the name was not used during transcription. Recorded responses from each participant were transcribed verbatim and not interpreted or paraphrased in any way. For those doing the transcribing, it was ensured that they would not reveal any names that might have been mentioned in the voice recordings.

In order for the researcher to observe patterns of workers' activities and the layout of the workplace, structured observation was used. Workers were observed as they were conducting their daily routines and the set-up of the workplace was also observed to determine if there may be potential for occupational accidents. No workplace or worker behaviour was modified during the researchers visit.

3.11 DATA ANALYSIS

Polit and Beck (2008) defines data analysis as a process where a researcher fits data together in order to link meanings to experiences using words. For the current study, thematic analysis was conducted that yielded themes. The Tesch's method of data analysis was used to generate themes and sub-themes.

3.11.1 Analysis of transcribed data

Clarke and Braun (2013) define Thematic Analysis (TA) as a method that is used to identify and analyse patterns in qualitative data. This method allows researchers to apply TA across different research designs and theoretical frameworks and is open to diverse research questions (Clarke & Braun, 2013).

In order to represent the experiences of participants, the researcher identifies themes that repeat themselves (Barbour, 2008). Transcribed data is read repeatedly until the researcher has a clear understanding of the entire data set (Clarke & Braun, 2013; Barbour, 2008). The researcher always tries to remain aligned to the purpose of the study in order for the focus of the study not to be lost.

The Tesch's method of data analysis was used to analyse data for the current study as described by Creswell (2009). The method was used together with that of Clarke and Braun for the analysis. The following Tesch's eight steps and those of Clarke and Braun were undertaken for the analysis of data:

- Clarke and Braun (2013) emphasised that researchers should read and reread the transcribed data until saturation in order for them to understand the depth of the content. Through this process of repeated reading researchers are able to identify patterns within the data and familiarise themselves with the content.

  The researcher became familiar with the data by reading through the transcribed documents and repeating the process several times. This was done for the purpose of understanding and clarifying what is contained in the data. As certain ideas emerged the researcher noted them down. In some cases, the researcher used coloured highlighters to classify related patterns together.

- The researcher then picked one interview from the transcribed data and read through it in order to understand what it was about. The researcher then wrote a summary of the interview, keeping the purpose of the study in mind.

- A list of topics was generated thereafter. Similar topics were grouped together and those that were deemed to be in excess were set aside. During this stage of data analysis, the researcher would have an idea of what was in the transcribed data, and started generating codes. Barbour (2008) defines coding as an attempt to compress data in such a way that the retrieval of information is acceptable later during data analysis for comparison purposes.

  Codes are used during analysis as a way of organising data into collections that are relevant and meaningful to the study. Clarke and Braun (2013) further explain codes as a way to thoroughly organise data in order to understand its meaning. During the generation of codes, the researcher should keep in mind the aim of the study and careful attention should be given to all sections of the transcribed data.

  Researchers then identify repeating patterns and code as many identified patterns as possible (Guest, MacQueen & Namey, 2012). In the current study, the researcher developed codes after going back to the data. During this stage of data analysis, the researcher determined if there were new categories and codes that had emerged. During coding the researcher used a combination of emerging and established codes (Guest, MacQueen & Namey, 2012).

- Once the researcher has identified patterns and coded them, the codes are sorted into potential themes. A theme is a central result from analysed data from which results of an investigation emerge (Green, Willis, Hughes, Small, Welch, Gibbs & Daly, 2007). During this stage the researcher used mind-maps as a way of generating themes from the identified codes.

  The researcher then goes through all identified codes generated during the previous stage and formulates the main themes. Some of the codes are combined depending on their meaning, others are merged into sub-themes, and others removed altogether and not used (Löfgren, 2013). This stage ends once the researcher is able to generate themes and sub-themes.

Using a mind-map the researcher sorted codes into themes, with some of the codes being combined as they had similar meanings. The relationship between identified themes was indicated in the form of diagrams.

- After the themes and sub-themes are generated, the researcher starts refining them. The process of refining can conclude with some themes being merged and others being completely discarded.

- For the researcher to be satisfied with the final themes such themes should link with each other; they must be consistent with each other and with the flow of ideas (Clarke & Braun, 2013).

The reviewing of themes process is done by reading through the coded data until the researcher is satisfied that the identified themes are in line with the purpose of the study under investigation. The researcher then decides on the sequence of the themes based on which one is more important than the others (Löfgren, 2013).

In this current study, the researcher reviewed the identified themes and linked them with the purpose of the study based on why they are important, and then a final decision was made on the arrangement of the themes.

- During this stage the researcher analyses the identified themes in order to find out if they make sense and how they relate to the study. Each theme should be thoroughly interrogated to determine how each theme fits into the study and how coherent they are with each other. The researcher should describe each theme to ensure that its meaning and relation to the study are understood (Löfgren, 2013).

After the themes were prioritised, the researcher aligned each theme to relevant data material as proof that each theme is matched with data from the participants. It was during this stage that preliminary analysis was performed.

- Once the researcher has refined the themes and is satisfied, the write-up stage begins. It is during this stage that the researcher presents the themes that were identified, backing them with relevant citations from the transcribed data.

The citations should not just be any piece of written data but transcribed data that is relevant (Clarke & Braun, 2013; Löfgren, 2013). Recording of data, which Vaismoradi, Jones, Turunen and Snelgrove (2016) describe as a description that presents the general picture of the phenomenon under investigation, was then performed where necessary.

3.12 MEASURES TO ENSURE TRUSTWORTHINESS

Lincoln and Guba (1999) indicated that for a qualitative study to be trustworthy it is important to evaluate the worth of the study. The worth should be based on how genuine the study is, its applicability to other studies, its consistency, and the neutrality of the researcher. Lincoln and Guba (1999) further identified four criteria in order to establish trustworthiness in a study, which are:

- Credibility
- Transferability
- Dependability
- Confirmability

Below is a discussion of the four criteria that were applied to ensure trustworthiness of the data.

3.12.1 Credibility

Credibility in the study ensures the resemblance of the results with reality (Shenton, 2004). Lincoln and Guba (1999) described techniques for ensuring credibility, which are prolonged engagement, persistent observation, triangulation, peer debriefing and member checks.

3.12.1.1 Prolonged engagement

Prolonged engagement is about spending a considerable amount of time in the field in order to be able to learn more about the phenomenon under investigation. This could be done by either being in the field for an extended period or spending a lot of time talking to participants. This assists the researcher to gain more knowledge about the subject being studied, and to build a good relationship with the participants. Prolonged engagement also improves trust between the researcher and the participants (Onwuegbuzie & Leech, 2007).

In the present study the researcher spent a lot of time with the participants during interviews, with each interview lasting an average of 30 minutes. The researcher was able to build trust with the participants who were free to relate the required information. The researcher familiarised himself with the culture of participants through prolonged engagement in order to gain enough understanding about the different industries. Through that the researcher ensured that rapport was built with participants.

3.12.1.2 Persistent observations

The purpose of persistent observation is to identify the characteristics of the phenomenon under investigation that are relevant to the problem (Guba & Lincoln, 1994). The researcher should be able to get in-depth information during the study and be able to discard information that is not relevant to the study. As the researcher possessed relevant knowledge regarding occupational health and safety, it was not difficult for him to observe behaviours and conditions within the workplace that were not relevant to the study. The researcher was able to collect relevant information through persistent observations in the industries.

3.12.1.3 Triangulation

Triangulation is used as a way of reducing bias through multiple data collection methods, which facilitates a deeper understanding of the phenomenon being investigated (Guba & Lincoln, 1994). To ensure that the findings were well developed the researcher used different data collection methods.

Triangulation of data collection was done through one-on-one interviews together with an exploration of the training programmes and observations of the industries in order to do cross-verification of the collected data. Only participants who understood the purpose of the study and were willing to participate in the study were interviewed. The researcher interviewed diverse participants to obtain different views and used probing questions to uncover information that might be missing or not tallying with some responses.

3.12.1.4 Peer debriefing

The purpose of peer debriefing is to seek professional support from individuals with prior knowledge regarding either the subject matter, methodology or both. Guba and Lincoln (1994) explain peer debriefing as a means for the researcher to reflect on data that was collected in order to clean it.

To clean data the researcher should seek the assistance of peers or supervisors to identify gaps or where the study was losing focus. For the current study, the researcher had frequent correspondence with supervisors and peers who offered comments.

After each data collection session, the researcher secured sessions with the supervisors to identify gaps, if any, that might have led to the study losing focus.

3.12.1.5 Member check

This criterion is used to track participants in the study as a way of validating collected data. Member check was done to verify mistakes in case the researcher misinterpreted certain facts. This also lets participants know what information the researcher has captured about them (Shenton, 2004).

For this study, member checking was done with participants after the analysis stage at their workplace where data was collected. The purpose was to inform them of the findings of the study and for them to go through the transcripts to verify that what was captured was a true reflection of what they had said during the interviews. During the analysis stage, the researcher also used transcribed data to support the themes that were identified in the report. This was a way of proving that all the themes emanated from the raw data and not from the researcher’s assumptions.

3.12.2 Transferability

This is the extent to which the study findings can be applied elsewhere (Shenton, 2004). Guba and Lincoln (1994) identified a strategy called thick description as a way of ensuring that the results of the phenomenon that was investigated could be generalised elsewhere. Thick description is a way of determining validity in a study (Guba & Lincoln, 1994). The study methodology needs to be thoroughly described to ensure clarity to those intending to utilise the findings.

In the current study, transferability was achieved through the use of purposive sampling to select participants for the study. Sampling of participants was done in such a way that all categories of industries were represented and purposeful sampling was used to select participants who were available and willing to participate in the study.

Selected participants were those who worked in high risk areas and had experienced accidents in the workplace. The description of the causes of occupational accidents by the participants, coupled with the method of data analysis, ensured that the results of the study could be used by other industries with similar challenges to those identified in the study.

Below is a breakdown of how transferability was addressed in the study.

3.12.2.1 Number of industries that participated in the study

Purposive sampling was used to select participants from 13 manufacturing industries in the Polokwane municipality and the 13 manufacturing industries represented the five categories of industries in the area. The five categories were brick manufacturing, food and beverages manufacturing, wood processing and wood-related products manufacturing, household detergents production and those producing material for roads construction. Transferability could be achieved if the same sampling method is used.

3.12.2.2 Number of participants who participated in the study

A total number of 22 participants were interviewed during data collection and all of them had knowledge regarding the operations of their industries and had experienced or knew of occupational accidents that occurred at their respective workplaces.

3.12.2.3 Data collection methods

Data was collected using three methods that complemented each other. First the researcher observed the workplaces and was guided by a checklist adopted from Bonell (2009). The second method used for data collection was a review of health and safety training programmes that the manufacturing industries in the Polokwane municipality used to train their workers. The third method used was interviews that were conducted with 22 participants, which included managers, supervisors and general workers.

3.12.2.4 Duration of the data collection process

It took the researcher at least five months, from 2015 to 2016, to collect data from all manufacturing industries of the Polokwane municipality. The data collection process was broken down into three phases; observations, review of health and safety training programmes and interviews. In addition, the researcher did member checking for three weeks and validation of the training programme which lasted for an additional three weeks.

3.12.3 Confirmability

Confirmability refers to the assurance that the findings of the study are based on the experiences of participants and not based on the views of the researcher (Shenton, 2004).

3.12.3.1 Role of triangulation

As indicated, three data collection methods were used to collect data in this study. These methods complemented each other because the researcher was able to link findings from one method to those of the other methods. Another advantage of using multiple data collection methods was that the researcher, in some cases, was able to gather information that other data collection methods could not identify.

3.12.3.2 Participants ideas not that of researcher

The researcher ensured that the findings of the study were not based on his own ideas but those of the participants by voice-recording the interviews and using an independent transcriber (**APPENDIX J**) to transcribe voice-recording and using a co-coder

(**APPENDIX F**) to ensure that the themes that were identified from the analysis were correct and evidence-based.

3.12.3.3 Bracketing

To avoid bracketing, the researcher ensured that all questions that were asked were based on the central question and not based on what the researcher was thinking. The researcher also did not include manufacturing industries within the area that he was familiar with.

3.12.3.4 Why certain methods were preferred over others

The researcher preferred purposive sampling over simple random sampling to avoid selecting participants who did not have relevant information. Only participants who were working in areas high risk areas and had worked for the industry for at least five years were selected to participate. The researcher also preferred a qualitative research method because this method was able to offer detailed information from the participants' natural setting, and the participants were able to give their own viewpoints. Through this method, the researcher was able to interact with participants and uncovered the experiences of the participants through interviews.

3.12.4 Dependability

Dependability ensures that the study yields the same results if the methodology used is repeated amongst the same participants under the same conditions (Shenton, 2004). Cohen et al. (2011) further explained dependability as a way of ensuring that the analysis of data, its interpretation and recommendations are based on collected data and not on the researcher' assumptions. Guba and Lincoln (1994) identified inquiry audit as a technique for ensuring dependability. An inquiry audit is used by independent researchers to validate accuracy based on whether the findings, interpretation and conclusions are supported by recorded data.

To ensure that the study results were dependable, the methodology that was applied in the study was fully explained in the report. The methods that were used to collect data, the duration of data collection and the number of sessions that the researcher had to

collect data were clearly defined. The researcher further involved peers and supervisors to validate the accuracy of results with the data.

3.13 BIAS

The use of purposive sampling to select participants with knowledge of the industries regarding the subject also assisted in avoiding bias since the selected participants had knowledge of the subject being investigated. The researcher applied the process of 'bracketing' where all pre-conceived ideas and beliefs regarding the industries were upheld.

Approximately five manufacturing industries in the Polokwane municipality that the researcher had interaction with prior to the study were not included in the study because the researcher already had an idea of what was happening within those industries with regards to health and safety.

3.14 ETHICAL CONSIDERATIONS

Ethics in research involves a set of morals, rules and standards that govern a researcher's conduct during research. It involves the good conduct and honesty of the researcher towards the research participants. In research there should be an assurance that participants are respected and protected at all time during the study (Hammersley & Traianou, 2012).

The following ethical standards were observed throughout the study:

3.14.1 Ethical approval

First the researcher presented the research proposal before the Senior Degrees Committee of the School of Health Care Sciences and then sought ethical clearance from the Turfloop Research Ethics Committee (TREC) (**Appendix A**). Once ethical clearance had been granted by TREC, permission to conduct the study was requested from the provincial office of the Department of Health (**Appendix B**) and the selected industries in the Polokwane municipality (**APPENDIX D**). Request for permission to conduct the study

from the manufacturing industries was done telephonically and via emails. Some of the industries sent permission to conduct the study via email.

3.14.2 Informed consent (Appendix C)

Informed consent means a participant knows and understands the study they are agreeing to participate in and that they do so voluntarily. In this study, participants, who were workers in the manufacturing industries of the Polokwane municipality, were informed about the purpose of the study, and the procedures and risks involved in the research prior to them consenting to participate. The objectives, duration and benefits of the study were explained to them prior to participation in the study. Those who agreed to participate in the study signed a consent form. Participants were informed that participation in the study was voluntary and that they could withdraw from the study at any time.

3.14.3 Confidentiality and anonymity

Confidentiality and anonymity refer to the extent to which the researcher respects the participants (Hammersley & Traianou, 2012). No response from any participant was linked to their identity. Their names, job titles, their age or even experience at work will not be revealed anywhere in the document.

The location and types of industries sampled were not be revealed and after the voice recordings were transcribed, the voice recorder used during data collection was sealed and will be stored safely for at least five years where only the researcher can access it. Information gathered from participants was used for the sole purpose of the study.

3.14.4 Privacy

Privacy means the invasion of personal information like beliefs, ideas and attitudes without permission (Hammersley & Traianou, 2012). Participants should be briefed on what the study is about, the aims, how data will be collected and stored and the techniques that will be used in the study. In this study, participants were assured that their names will not be publicised and collected data will only be used for the purpose of the

study. As a voice recorder was used in the study, participants were assured that the information will not be given to anybody and voice recordings were only done to ensure that all information was captured.

3.14.5 Harm to participants

Harm to participants can either be physical or emotional. Physical harm refers to bodily injuries that participants may incur if they participate in any physical activity or are requested to perform certain tasks that could injure them. Emotional harm refers to reawakening of emotions linked to an incident that may have occurred a long time ago by the researcher through questioning (Hammersley & Traianou, 2012). The researcher should weigh the risk of harm against the benefits of the study before continuing. It was explained to participants before the study started that there was no identified harm to participants and they were debriefed at the end of each session.

3.15 CONCLUSION

This chapter focuses on the methodology that the researcher applied to answer the research question. This chapter guides the researcher on how to select study participants, collect data and analyse it without compromising data quality. The next chapter presents the results of the study, discussion and literature control.

CHAPTER 4

DISCUSSION OF RESEARCH RESULTS

4.1 INTRODUCTION

The previous chapter focussed on the research methodology that was followed in the study, including study design, population, selection of participants, data collection and the data analysis methods used. This chapter outlines the findings of the study which were guided by the research question: **Could you kindly describe the causes of occupational accidents among manufacturing industries in the Polokwane municipality?**

The aim of the study was to develop a training programme for manufacturing industries in the Polokwane municipality. Analysis of data was conducted on the explored and described data of the causes of occupational accidents amongst manufacturing industries in the Polokwane municipality. The findings emanated from data collected from observations, reviewing of existing health and safety training programmes from industries and face-to-face interviews.

4.2 DEMOGRAPHIC INFORMATION OF PARTICIPANTS

Study participants were selected purposefully because they worked for different manufacturing industries of the Polokwane municipality and were from different job categories.

The total number of participants were 22. There were 4 managers, two were male and two were female; 6 supervisors, five were male and only one was female; and 12 general workers, 8 were male and 4 were female. The workers from different job categories within the manufacturing industries were selected in order to obtain first-hand information, as events unfold at different levels at work regarding the causes of occupational accidents.

The manufacturing industries were selected because they have been reported to have the second highest number of occupational accidents in the Polokwane municipality, with the highest being the construction industry (Department of Labour Report, 2013).

The construction industries were not included in this study because most of the construction work occurs over a short period of time and the statistics from Department of Labour Report (2013) included activities that occurred prior to the 2010 South African Soccer World Cup tournament, and the event has since passed.

4.3 FINDINGS AND DISCUSSION FROM COLLECTED DATA

The researcher used three methods to collect data with the purpose of exploring the causes of occupational accidents in the manufacturing industries of the Polokwane municipality. The three methods used complemented each other when trying to answer the research question. Data was collected using the following:

- review of health and safety programmes in manufacturing industries of Polokwane municipality,
- observations and
- face-to-face unstructured interviews.

4.3.1 Findings from reviewed health and safety training programmes in the manufacturing industries of the Polokwane municipality

For the evaluation of the health and safety training programmes the researcher used guidelines from OSHA (1989), which focused on four critical areas. The four critical areas are management commitment towards health and safety, involvement of workers, risk assessment, and hazard prevention and control.

These areas are presented as themes and they outline the commitment that management undertook to ensure a healthy and safe workplace, the type of training that management offers to workers, the role that workers play in the development of industry policies, how risks are assessed in the industry and whether it is indicated how identified hazards are mitigated in the industries.

Table 4.1 Themes reflecting the review of health and safety training programmes in the manufacturing industries of the Polokwane municipality

Theme 4.1.1: Management commitment towards health and safety
Theme 4.1.2: Health and safety training of workers
Theme 4.1.3: Lack of involvement of workers in health and safety policies
Theme 4.1.4: Lack of risk assessment at the workplace

The findings indicated that the majority of manufacturing industries in the Polokwane municipality did not have any health and safety training programmes. Only one manufacturing industry in the study had a health and safety training programme. The health and safety programmes from the one manufacturing industry of Polokwane was reviewed for management commitment towards health and safety, lack of workers' involvement in health and safety policies, lack of risk assessment at the workplace, and hazards prevention and control.

4.3.1.1 Theme 4.1.1: Management commitment towards health and safety

The findings of the study revealed that only one manufacturing industry, out of the 13 manufacturing industries in the Polokwane municipality, indicated that management is committed to the health and safety of workers. The training programme clearly indicated the role management plays in the overall management of health and safety in their industry. The training programme indicated the workers' participation in the development of health and safety policies and identification of their training needs, and that management monitors compliance to industry health and safety through their supervisors. Each supervisor is assigned tasks according to the different sections they work in. Each section has specific and different hazards and requires certain skills and knowledge.

Offering health and safety training to both management and workers is an important mechanism in bringing the much needed knowledge and assistance for proper decision-making, which leads to a healthy and safe workplace (Weinstock & Slatin, 2012). All workers in all job categories and at all management levels will be able to understand their work situation and will have the ability to act accordingly to prevent or minimise occupational hazards. These findings are consistent with Ndegwa, Guyo, Orwa and Ng'ang'a (2014) who reported management support in most Kenyan manufacturing industries, which ultimately paved the way for the implementation of health and safety programmes. They reported higher worker satisfaction, leading to high production and reduced costs to management. Makhamara and Simiyu (2016) reported that management in a Kenyan oil refinery industry were supporting their workers in matters relating to health and safety.

According to the OSHA (1989) guidelines, a comprehensive health and safety training programme should at least indicate how management is committed to health and safety issues in the workplace. A management that is committed to the health and safety of their workers is able to build a culture of safety within an industry. The safety culture and climate within which workers operate assists industries to be consistent with the goals of an industry (Mearns & Reader, 2008) and it encourages the responsibilities of workers' and commitment towards health and safety in the workplace.

Most workplace injuries are avoidable if management is committed and available to its workers (Workers' Compensation Board of PEI, 2009). It is the responsibility of the employer to provide workers with a safe working environment and, through the commitment of management, such an environment can be achieved (OHSA, 1993).

A management that offers support to its workers yields positive results (Nadine & Jennifer, 2013) through motivation, planning, implementation of policies and provision of policies (Njenga, Kamau & Njenga, 2015). Management is responsible for establishing the goals and objectives of an industry and to develop policies, and their commitment to health and safety is important to workers' health and safety and industry growth (Zakaria, Mansor & Abdullar, 2012).

Management commitment means all levels of management within an industry should be actively involved in health and safety issues. Managers, supervisors and safety officers form part of the management team and should therefore provide the necessary resources for health and safety to all workers (ILO, 2006).

Lack of management commitment to health and safety leads to a low level of compliance, and little or no allocation of resources, which could lead to occupational accidents (Fernández-Muñiz, Montes-Peón & Vázquez-Ordás, 2009). Safety at the workplace begins with workers' loyalty towards the industry and its management. In order to achieve that, management should prioritise health and safety in the workplace. Management should demonstrate commitment by investing in health and safety training of workers (Amponsah-Tawiah & Mensah, 2016). Failing to commit to that, will result in a workforce that is demoralised and feels unsafe at work (Yule, Flin & Murdy, 2007).

In most industries, production is a priority; whereas, the health and safety of workers is not considered. However, once occupational accidents occur, costs to the industry are increase due to penalties from regulatory bodies and government (Yule, Flin & Murdy, 2007). Furthermore, Taufek, Zulkifle and Kadir (2016) indicated that safety and health practices and injury management are hindered by an industry management that does not consider health and safety training and who views it as less important. The lack of consideration for general safety and health matters lead to a high number of occupational accidents (Taufek, Zulkifle & Kadir, 2016).

4.3.1.2 Theme 4.1.2: Health and safety training to workers

The only manufacturing industry in the Polokwane municipality with a health and safety training programme indicated how training is offered to their workers. Training is offered by qualified supervisors and, in most cases, the industry management hires training institutions to offer training to their workers. The training offered by the qualified supervisors does not cover all aspects of health and safety related to their workplace, like the maintenance of machinery and other equipment, and the use of the machinery. These aspects are covered by experienced training institutions that have been sourced to train their workers.

Offering workers training on how to execute their duties assists the industry to minimise occupational accidents, because they will have a workforce that is knowledgeable on health and safety practices. Well-trained workers are able to follow instructions as laid out in their standard operating procedure documents. It becomes easier for supervisors and managers to delegate certain tasks to their workers, without the risk of allowing unskilled workers to operate machinery and use tools.

General lack of knowledge due to insufficient training amongst industry workers and management still remains a huge challenge in developing countries. Workers in most of these industries are reported to have a negative attitude towards health and safety because of lack of information regarding health and safety in the workplace. In most developing countries, no training is offered to workers and the general condition of workplaces is poor (Ahmad, Sattar & Nawaz, 2016).

Training for both management and general workers is vital because it encourages workers to be more knowledgeable, alert and productive and it increases safety in the workplace. Most developed countries prioritise health promotion and risk management, which forms a foundation for their workplace health and safety programmes (Ahmad, Sattar & Nawaz, 2016).

According to Section 1 of the OHSA (85 of 1993), the employer should ensure that, as reasonably practical, workers possess knowledge regarding hazards and risks in the workplace, which would assist them to mitigate those hazards and risks. Workers can only get the skills and knowledge through the relevant training. Section 14 of OHSA (85 of 1993) further provides guidance to workers on how to take control of their own health and safety at work, including those around them. Workers are supposed to carry out lawful acts and health and safety instructions whilst executing their duties.

A study conducted amongst industries in Western Australia found that, after workers were offered training in health and safety, the number of occupational injuries decreased and workers became alert and more productive (Bahn & Barratt-Pugh, 2013). Vinodkumar and Bhasi (2010) further highlighted that training in health and safety is a key to safety management for workers.

Trained workers gain more safety knowledge and are able to comply with health and safety regulations and participate in all health and safety programmes.

Failure to offer training in health and safety in the workplace becomes evident in the increase in the number of reported occupational accidents (Ali, Abdullah & Subramaniam, 2009). Systematic risk assessment is seen as the core to maintaining a healthy and safe workplace (Ahmad, Sattar & Nawaz, 2016).

Health and safety training enhances skills and knowledge and it improves workers' performance (Makhamara & Simiyu, 2016). One of the cornerstones of a safe and healthy working environment is the training of workers on issues related to health and safety (Varghese & Jayan, 2013). Workers should be trained in such a way that they are able to prevent, avoid or minimise occupational accidents and promote health and safety (WHO, 2010). Workers who are trained are able to follow work instructions and adapt well to their work environment. The type of training that is offered to workers should meet the required needs of the type of work and ability of workers (Alli, 2008).

The purpose of offering health and safety training is to ensure that workers are able to act in such a manner that their activities do not cause harm to their health and those around them (OHSA, 1993).

4.3.1.3 Theme 4.1.3: Lack of involvement of workers in health and safety policies

The reviewed health and safety programme from the only one manufacturing industry in the Polokwane municipality did not specify the role that workers play in the development of the health and safety policies. Most of the information in their health and safety programme was focussed on the roles of management, and to a lesser extent, that of the supervisors. The role of the workers in the development of health and safety policies and the role they should play in the implementation of health and safety in the industry were not indicated.

It was evident from the study findings that non-compliance by workers led to compromised health and safety within the industry. The reason for the non-compliance with the health and safety rules is due to the workers feeling that the programme is imposed on them as they did not participate in the development of the health and safety rules.

The findings are consistent with those of Portell, Gil, Losilla and Vives (2014) who reported that failure to engage workers in the development of health and safety programmes resulted in workers disobeying the safety rules. This is because the workers feel that they know more about operational issues than management and they could identify safety requirements more easily than the supervisors. Wachter and Yorio (2014) reported that the use of policies, procedures and risk assessment do not guarantee compliance to health and safety but the involvement of workers in the development of such programmes improves industry health and safety management. Engaged workers influence their work condition and how they perform their allocated duties (Brøgger, 2010).

The findings from Indian industries by Beriha, Mahapatra and Patnaik (2012) indicated that management involved workers in the development of health and safety programmes because workers know the physical work environment better than those in management. The involvement of workers showed an improvement in work ethics and a workforce that was more satisfied. Similar results were reported by Kim, MacDuffie and Pil (2010), that a lone worker's voice is vital in key decision-making in the workplace. Each worker plays an important role in any industry, but low participation affects morale and efficiency.

The type of practice were workers participated in policy development was implemented during the first century in a Roman farm utilising slaves. The slaves contributed towards the growth of the farm after their master offered them an opportunity to contribute towards their work. The same philosophy was later copied and applied in most American and European countries (Columella, 1941). The findings by Brijlall (2015) from a study in a cement manufacturing industry in South Africa further indicated that the engagement of workers in health and safety issues empowered them and gave them a sense of ownership of the programme, which encouraged them to follow rules and procedures.

In addition, a study on the relationship between work engagement and performance reported that engaging workers in health and safety activities improves their performance and benefits industries through an improved work environment and productivity (Kim, Kolb & Kim, 2012).

4.3.1.4 Theme 4.1.4: Lack of risk assessment at the workplace

From the reviewed health and safety training programme from the only manufacturing industry of the Polokwane municipality with a health and safety programme, the area of risk assessment is not addressed anywhere. Workers in that manufacturing industry are not trained on how to assess, record or report any accident or incident that they encounter whilst executing their duties.

Risk assessment is a key component of a health and safety training programme. This enables workers to be able to identify hazards and risks in their workplace. Failure to identify common workplace hazards could lead to workers acting in a manner that could cause harm to their health and those working around them. Risk assessment assists workers to understand why they should comply with health and safety rules. The implication of not having risk assessment is that it makes following up on accidents and implementing control measures difficult. It may also affect compensation claims with regards to occupational injuries.

In any manufacturing industry, a management team that shows commitment to health and safety assists in the reduction of occupational accidents. This is in contrast with a management that only focusses on production and profit. A committed management team makes available all resources required to ensure a healthy and safe workplace. commitment from management includes communication of relevant health and safety information and safety training that increases safety knowledge and awareness at work. Workers who are involved in the development of health and safety programmes are able to influence the safety culture. These workers are able to identify and engage in work activities that are safe. The combination of a committed management that engages it workers and training of workers regarding risk assessment and hazard prevention yields a safe and healthy workplace.

Health and safety training that is offered focuses on how workers should conduct themselves as they perform their duties, without indicating to them how they should identify hazards, which is part of risk assessment, in their respective work areas. Rout and Sikdar (2016) found out that risk assessment helped reduce high-risk hazards to a reasonable level in an iron ore industry in India. Failure to conduct risk assessment leads to a workforce that is demotivated, unskilled and with lack of knowledge (Haslam, O'Hara, Kazi, Twumasi & Haslam, 2016). A study in a drilling industry of Iran reported that failure to conduct risk assessment exposes workers to various health threatening hazards (Shadizadeh & Ataallahi, 2015).

4.3.2 Findings from Observations

The observations in this study were conducted in order to identify the causes of occupational accidents in the manufacturing industries of the Polokwane municipality. In support of the observations made in this study, Song and Sung (2011) explain that observation studies do not require any intervention by the researcher but rather focus on assessing the strengths and relationships between variables.

The use of observation as a data collection method was beneficial to the researcher because it offered a deeper understanding of the phenomenon under investigation. The purpose of using observations in the study was to link participant interviews and the review of health and safety training programmes with regards to the causes of occupational accidents. Observations also assisted the researcher to understand the physical work environment of the participants and to observe their conduct as they were performing their duties.

Observations help researchers to understand participants' actions, roles and behaviour (Walshe, Ewing & Griffiths, 2011) by watching a phenomenon attentively in its natural setting (Sani, 2013). One session per observation was conducted at each of the 13 industries. The duration of each observation differed according to the size of the industry.

The purpose of the visit by the researcher was not revealed to workers as informing them would cause the workers to modify their conduct during work as outlined by Walshe, et al., (2011).

At least 13 industries were visited and the researcher did a walk-through investigation using a checklist of items observed. All industries were visited in the morning just after the workers had started their shifts and the unstructured observations lasted for ninety minutes on average.

In some cases, the researcher asked workers some questions for clarification but most of the time workers were left to execute their duties without any interference from the researcher. Items that were observed using the checklist were related to protection of workers working at heights, the working area, and provision and use of PPE. A checklist adopted from Bonell (2009) and modified to suit the conditions of the manufacturing industries that were participating in the study was used.

Based on Bonell (2009) guidelines the researcher focused on the protection of workers working at heights, the correct use of PPE and the working area, as indicated in Table 4.2. Each of the three indicators had its own focal areas as presented below.

Table 4.2 Themes reflecting findings from observations

Theme 4.2.1: Protection of workers working at heights
Theme 4.2.2: The use of PPE during shifts

4.3.2.1 Theme 4.2.1: Protection of workers working at heights

The researcher wanted to determine if the workers are protected in manufacturing industries that have workers working at heights. In order to ascertain this, the checklist

had items checking if there are workers working at heights, if there was any fall protection plan, communication of hazards and risk control measures to workers, offering of training for workers working at heights and if workers carry heavy loads up or down the stairs.

It was found out that only 4 manufacturing industries in the Polokwane municipality had areas where workers were working at heights. During observations the following 4 aspects related to working at heights were observed:

- Sub-theme 4.2.1.1: Availability of a fall protection plan

The researcher wanted to determine if the industry had any protection plan for workers working at heights. Of the 4 industries where workers were working at heights, only one manufacturing industry had a protection plan for their workers and the other manufacturing industries did not. Fall protection plans include the provision of fall protection material, unguarded walkways and mentoring.

In three manufacturing industries there was no fall protection material like fall arrest and guardrails that shield workers against falling, especially since most of the workers carried heavy loads up and down the stairs. At the elevated floor where workers were executing their duties there were no guards in the walkways and supervision of those working in those area was not visible.

These findings are similar to those of Borjan, Patel, Lefkowitz, Campbell and Lumia (2016) who reported lack of a fall protection plan, leading to falls from heights. Most of the workers who incurred injuries did not have fall protection material (Borjan et al., 2016).

Lack of training regarding fall protection and the use of protection material, and lack of mentorship at the workplace accounts for most industrial accidents (Kaskutas, Dale, Limbscomb & Evanoff, 2013). Where there is mentoring of workers, the mentorship was of poor quality and therefore served no purpose in protecting workers against fall accidents (Kaskutas, Dale, Nolan, Patterson, Lipscomb & Evanoff, 2013).

- Sub-theme 4.2.1.2: Hazards and risk control measures communicated to workers working at heights

The researcher wanted to establish if the manufacturing industries in the Polokwane municipality communicate measures for hazards and risk control to those workers working at heights. Figure 4.1 indicates that in all 4 of the manufacturing industries in the Polokwane municipality that have workers working at heights, hazards and risk control measures are communicated to workers. Workers were informed of hazards that they are exposed to whilst working at heights and what might be the consequence.

Supervisors were the ones communicating the hazards and risks to workers who worked at heights. In some industries there were warning signs that indicated hazards at specific sites. These results are consistent with a study by Zwetsloot, Kines, Ruotsala, Drupsteen, Merivirta and Bezemer (2017) who investigated the importance of commitment and communication when striving for zero accidents in European companies. Similar findings were reported by Kim, Park and Park (2016) who indicated that communication and collaboration amongst stakeholders in any workplace leads to a culture of preventing occupational accidents.

- Sub-theme 4.2.1.3: Is there training for workers working at heights

Whilst trying to establish if there was training for workers working at heights, the researcher observed that not all workers from the 4 manufacturing industries were trained to work at heights. Only two manufacturing industries trained their workers on working at heights and the other two manufacturing industries did not, according to Figure 4.1. The two industries that offered training to their workers working at heights included classroom training where workers spent days being trained on hazards and risks related to working at heights. The two manufacturing industries had trained supervisors who conducted the training but in some cases outside organisations were hired to offer training.

Classroom-type training was reported as the most commonly used type of training during an investigation on the effectiveness of occupational health and safety training (Di Ricci, Chiesi, Bisio, Panari & Pelosi, 2015), which supports one of the training methods identified in two of the manufacturing industries of the Polokwane municipality.

The training of workers on safety is effective and workers are able to identify resources if there are safety challenges. Health and safety training also allows stakeholders to identify areas that need change within the workplace (Robson , Stephenson , Schulte, Amick, Irvin, et al., 2012).

Furthermore, training workers in general health and safety like hazard identification, supervision and a comprehensive safety programme plays a vital role in workers behaviour (Bahn & Barratt-Pugh, 2013). The use of protective equipoment alone can not reduce occupational accidents, but training serves a tool to improve health and safety (Ricci et al, 2015).

- Sub-theme 4.2.1.4: Workers carrying heavy objects up and down the stairs

The researcher wanted to determine if the workers who were working at heights also carry heavy objects up and down the stairs. In all 4 manufacturing industries that had workers working at heights it was observed that workers carry heavy objects up and down the stairs. Workers had to carry raw material and finished products up the stiars either for production or to store them. This was due to the absence of hoists that could easily carry such material and products to the elevated levels of the site.

Manual lifting of heavy objects, coupled with twisting and bending, put the workers in the manufacturing industries of Polokwane at risk of musculoskeletal disorders. Most of the workers carry heavy loads up and down stairs that are unguarded. Moving up or down unguarded stairs exposes them to an increased risk of falling because in most cases the area they are moving in is narrow and their view is obscured. Unguarded stairs mean that, should a worker slip or trip there would incur injuries to their limbs, legs or head. Manual lifting of heavy objects puts a lot of pressure on the trunk, leading to lower back pain.

To protect workers working at heights there should be a sound fall protection plan to ensure that workers do not fall whilst working. Some workers working at heights in the manufacturing industries of the Polokwane municipality were involved in fall accidents. There is an increased likelihood of others getting serious injuries due to unsafe working conditions. Lack of guardrails, slippery surfaces, lack of training and carrying of heavy objects is a recipe for disaster. Some workers in the manufacturing industries of Polokwane perform their duties in such a way that their health and safety is compromised due to the conditions under which they work.

Similar results were reported by Park, Kim and Han (2018) regarding workers carrying heavy loads, some on their shoulders. The manufacturing industries are reported to be the highest where workers are exposed to heavy lifting of objects. These workers who carry heavy loads up and down stairs experience physiological workload, leading to muskuloskeletal disorders (Chung, Lee, Lee & Choi, 2005).

This is further supported by the findings of Basahel (2015) who reported that lifting of heavy objects by workers is physically demanding as compared to pulling. Activities like frequent twisting, bending and lifting of heavy objects puts workers at a greater risk of developing MSDs.

Working at height exposes workers to multiple hazards and risks and intensive health and safety training is required (Bahn & Barratt-Pugh, 2013). Kaskutas, Dale, Limbscomb and Evanoff (2013) reported challenges where workers were not trained to work at heights, which lead to occupational accidents.

Training does not only develop workers but also serves as a motivating factor and reduces negative attitudes towards work (Othmana & Suleimanb, 2013). Being exposed to multiple hazards whilst working at heights requires knowledge of how workers should conduct themselves.

4.3.2.2 Theme 4.2.2: The use of PPE during shifts

The researcher also observed if workers put on their PPE at the start of their shift. The researcher observed workers as they entered their different work stations and also as they were working. The results of the observations are summarised below.

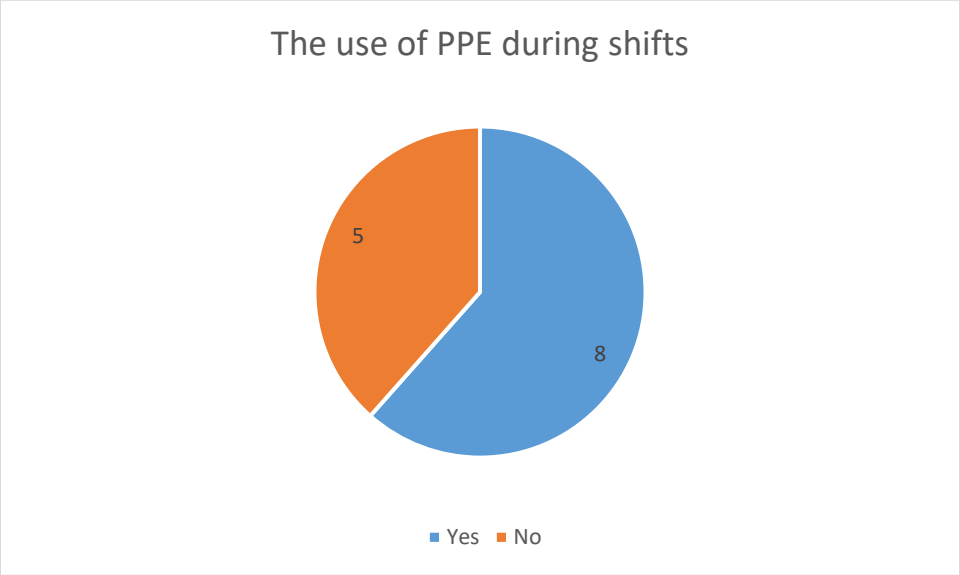


Figure 4.1 The use of PPE during shifts

According to Figure 4.1, in 8 of the 13 manufacturing industries workers had their PPE on during their shifts. The researcher observed that the type of PPE worn were gloves, masks, hard hats, ear plugs and hearing muffs, goggles, face shields and safety boots. These workers used PPE as a means of protecting themselves against any occupational hazards. Although the majority of workers in the 8 manufacturing industries were using PPE during their shifts, in the 5 remaining manufacturing industries, workers were not (Figure 4.3). These workers are exposed to hazards such as lacerations, falling objects and punctures every time they execute their duties.

Most workers are exposed to chemical fumes, dust, noise, sharp objects and heavy objects. Exposure to dust could lead to lung diseases, irritation of the respiratory system and eye infections. Most of the manufacturing industries visited during the study use chemicals for different production processes and failure to wear protective equipment exposes workers to different risks.

The risks range from skin irritation and burns for those who may come in to physical contact with the substance. For those inhaling chemical substances, there are risks of infection to their nervous system and some organs like kidneys and the heart.

Workers in the manufacturing industries of the Polokwane municipality who are exposed to too much noise daily in the workplace without correct PPE are at an increased risk for developing noise-induced hearing loss. This is an infection of the ear after prolonged exposure to excessive noise.

Apart from noise exposure, some workers in the manufacturing industries of the Polokwane municipality are exposed to sharp objects that, if not correctly protected, could lead to parts of the body being punctured and lacerated. There are also heavy objects that workers are exposed to either as raw materials or finished products. Heavy objects falling on workers who do not have PPE could injure their toes, hands and heads.

The findings of this study are consistent with findings by Kearney, Xu, Balanay, Allen and Rafferty (2015) who reported that farmers using chemicals adhered to the use of PPE as a means to prevent injuries. These workers were exposed to chemicals daily and 70% of them reported using PPE all the time during their shifts.

The highest number of workers reported to be using PPE was reported amongst textile factory workers in Southern Ethiopia. A total of 82.4% of the total workforce used PPE and they reported that safety comes first (Tadesse, Kelaye & Assefa, 2015). In contrast, Lu, Shi Han and Ling (2015) reported that migrant workers exposed to solvents did not use PPE during work. The reason mentioned was because they regarded the use of PPE as slowing them down and affecting productivity. These workers were paid according to the amount of work they had done per shift. In an automotive industry in Ghana workers preferred to work bare-hands as gloves made them uncomfortable (Apreko, Danku, Akple & Apelety, 2015). Awodele, Popoola, Ogbudu, Akinyede, Coker and Akintonwa (2014) reported that amongst paint factory workers in Nigeria, the majority of respondents reported having PPE but more than half of them did not use it.

Poor utilisation of PPE amongst workers was also reported in Iran by Jahangiri, Rostamabadi, Yekzamani, Mahmood Abadi, Behbood, Ahmadi and Momeni (2016) and Zungu and Gabe (2011) in Botswana even though PPE protects workers against any harm. In both these studies, workers reported being uncomfortable wearing PPE and working at the same time.

4.3.2.3 Theme 4.2.3: Enough working space for workers to perform their duties

The researcher also observed the workplace to determine if there was enough working area for workers. The researcher observed the physical work environment to establish if it was safe for workers to conduct their duties. The physical work environment was observed as the researcher was also observing other aspects like the use of PPE and work that is done at heights. The results of the observations of the working area are presented below.

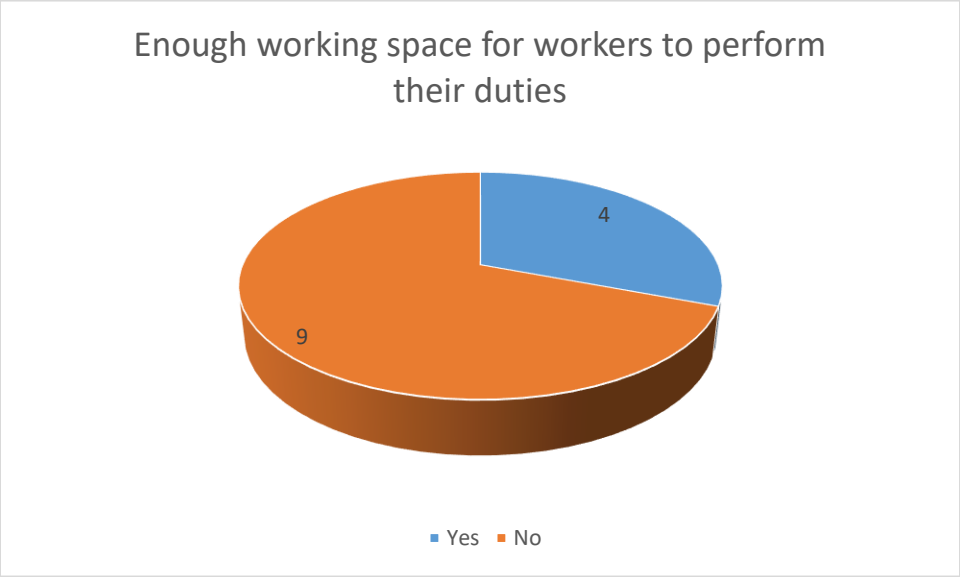


Figure 4.2 Enough working space for workers to perform their duties

During the observations it was found that the working areas in 9 of the 13 manufacturing industries of the Polokwane municipality did not have enough space for workers to perform their duties.

The working areas within these 9 manufacturing industries was congested with limited space for movement of either the workers or the equipment that they use to execute their duties. The limited space is used mainly for storage of raw material, production, storage of finished products, and to house administration offices.

Workers within the area are exposed to different types of hazards such as noise generated during grinding, cutting, and mixing of products, dust that is produced by substances used for production, heat due to lack of enough space, and poor ventilation. Everybody working within those industries are exposed to those hazards irrespective of whether they work within that portion of the industry or not.

It is evident from the findings for this study that the confined working areas expose workers to various occupational hazards as they are enclosed with restricted movement. Although the working areas in the manufacturing industries of the Polokwane municipality are not as enclosed as other confined spaces like silos, channels or underground caves, the restricted working spaces are a hazard.

A confined or congested working area exposes workers to machinery that is lying in an open space, and risk being caught between them. Raw materials like chemicals, leather, wood, and linen that are stored together are a fire risk.

The workers need to be aware that in some cases, the cutting and grinding of material like iron, steel and glass exposes workers to injuries like cuts and punctures. All these are due to limited space where workers are unable to separate sections of work because they are supposed to work in such confined spaces. Toxic gases or fumes that are released during production remain airborne for a longer period due to poor ventilation in most of the industries. Workers in the manufacturing industries are at risk for accidents like explosions because some of the chemicals are reactive, explosive or combustible and could cause fire.

A similar finding was reported in the Northern part of India where lack of available working space was prevalent amongst hand tool manufacturers. This was because there was no available land to expand the industries. The available land had to be shared amongst different industries (Singh, Bhardwaj, Deepak & Bedi, 2009).

Workers in manufacturing industries are amongst those who are exposed to occupational hazards in congested working areas. Such working areas expose them to hazards like heat stress, which is increased by global warming, the number of production machinery inside the working area, and poor ventilation (Xiang, Pisaniello & Hansen, 2014). All work processes are conducted in a single area, shared by different workers (Balakrishnan, Ramalingam, Dasu, Stephen, Sivaperumal, Kumarasamy & Sambandam, 2010).

Apart from heat stress, working in congested areas exposes workers to elevated noise levels. The source of noise in congested areas is machinery that produces a lot of noise, which is confined to the work space (Feder, Michaud, McNamee, Fitzpatrick, Davies & Leroux, 2017). The use of hefty equipment like grinders, presses and dropping hammers also increases the level of noise in manufacturing industries (Singh, et al, 2009).

4.3.3 Findings from Interviews

The researcher used interviews to try and answer the research question "**What are the causes of occupational accidents in the manufacturing industries of the Polokwane municipality, Limpopo Province?".** All participants were from the 13 selected manufacturing industries of the Polokwane municipality, and held different positions in each industry. Some were managers, others were supervisors, and the rest were general workers. The analysis was done in two ways; one for managers and supervisors, and the other for general workers. The reason for separating the analysis was that both managers and supervisors had similar responsibilities in the manufacturing industries of the Polokwane municipality and their responses addressed similar issues.

General workers were interviewed alone as a way of trying to determine the causes of occupational accidents at their workplaces according to their experiences. After analysis, vital themes emerged as a result of the causes of occupational accidents in the manufacturing industries.

The study yielded a total of 5 themes and 19 sub-themes for general workers and 2 themes and 8 sub-themes for managers/supervisors. These are tabulated below, with each explained separately below.

Table 4.3 Themes and sub-themes from general workers

Themes	Sub-themes
4.3.1. Existing hazards in the work environment that workers are exposed to	4.3.1.1 Existing mechanical hazards identified in the work environment 4.3.1.2 Existing physical hazards identified in the work environment 4.3.1.3 Existing chemical hazards identified in the work environment 4.3.1.4 Existing hazards experienced by working at heights
4.3.2. Descriptions related to workers' conduct during performance of tasks and the consequences thereof	4.3.2.1 An explanation that workers are negligent during execution of their duties 4.3.2.2 Ability versus inability to execute tasks leading to hazards affecting fellow workers 4.3.2.3 Lack of versus existence of safety awareness by workers and challenges thereof

4.3.3.	Training related to performance of duties by workers	4.3.3.1.	Lack of on-the-job training for workers leading to poor performance
		4.3.3.2.	Insufficient on-the-job training for workers reported
		4.3.3.3.	Inability of workers to transfer learnt skills leading to role conflict
		4.3.3.4.	Experienced workers using their long service as a form of training reported
4.3.4	Report on provision, utilisation and compliance to PPE described	*4.3.4.1*	Insufficient provision of PPE to workers reported
		4.3.4.2	Incorrect PPE provision to workers reported
		4.3.4.3	Lack of utilisation of provided PPE by workers outlined
		4.3.4.4	No provision of PPE to workers working in high risk areas reported
4.3.5	An account of limited Health and Safety measures at the workplace by those in leadership/management positions	*4.3.5.1*	Existence of insufficient culture of safety supervision by supervisors
		4.3.5.2	Insufficient inspection by regulatory bodies reported
		4.3.5.3	Lack of organisational regulations and enforcement for health and safety of workers
		4.3.5.4	Inadequate provision of health and safety in the psychosocial work environment

4.3.5.5 Theme 4.3.1: Existing hazards in the work environment that workers are expose to

The study found that there are hazards in the physical work environment. The physical work environment is where workers perform their duties and an area where production takes place, and where workers are exposed to different hazards. The workers reported that the physical work environment exposes them to different hazards. These hazards include heights, mechanical, physical, and chemical hazards and machinery.

- Sub-theme 4.3.1.1: Existing mechanical hazards identified in the work environment

Mechanical hazards were reported as a source of occupational accidents in the manufacturing industries of the Polokwane municipality. Mechanical hazards are those hazards linked to the use of different machinery. Defective or improper use of such machinery could lead to occupational accidents.

One participant reported that a machine used for production caught fire as they were busy working:

> GW 1: There was fire where the machine we use to manufacture polish caught fire and the whole company nearly burnt down.

Another occupational hazard identified was the forklifts that workers use to pack, unpack and load products and raw materials. One worker reported that:

> GW 2: Eish, there are about three that look very old but recently after the appointment of the supervisor some were replaced. Forklifts are very old, ever since I arrived here I never saw them replaced.

The worker further indicated how hazardous working with those forklifts were by saying:

> GW 3: If you check some of them they have no tyres, one of them had very defective tyres and when it rains I don't know how the operator operates it, that forklift is a serious risk

Mechanical hazards in the workplace also include mobile machinery as a source of occupational accidents in the physical work environment. Mobile machinery includes trolleys, mobile cranes and front loaders. Trolleys are usually operated manually and they move on rails with loaded materials like steel pipes, palisade and mash wires.

One general worker explained the dangers of working with trolleys by saying:

> GW 3: It's moved by a person, when that person is moving that trolley, it means that it's carrying pipes, there are these other pipes for… so those pipes have a tendency of rolling, you find that when he is operating that trolley, because it does not have a steering, it just moves on the rail… when he is walking, he is focused on the pipes

Mobile machinery in some manufacturing industries have a tendency to fail while in operation, as one worker explained by saying:

> GW 4: Because there are mobile cranes, mobile machines in the yard… sometimes their reverse will fail… you try to reverse and it beeps. I am aware of the incident where a certain person had a serious fracture to their leg due to mobile equipment… it was… he was sitting in a certain area and people were moving the mobile equipment not aware that he is sitting there and they actually drove over his feet

Another mechanical hazard in the manufacturing industries of the Polokwane municipality are the front loaders used to load raw material like sand, concrete, wood and food processing agents. A worker in one of the industries reported an accident caused by a front loader by saying:

> GW 5: The front loader reversed and it reversed over somebody so we got the flash this morning.

The mechanical hazards identified in the manufacturing industries of the Polokwane municipality indicate the risks that workers face. Moving machinery was reported to be one of the hazards in the physical work environment.

Moving machinery that is faulty is a source of occupational accidents as reported by one worker who said:

> GW 4: Any moving machine really can start at any time we know electrical things get… it's got a relay, relay can go faulty, emergency stop button can be faulty, if you want to push it

A worker further indicated the risks of mobile machinery by explaining some of the injuries that they experienced in their workplace. The worker explained by saying:

> GW 6: The second one eh, hazard is, eh, moving machinery, these moving machineries which cause amputations and laceration and yah

Lack of machinery maintenance was also identified as a hazard by workers. The potential for an accident was a concern as indicated by a worker who said:

> GW 7: …so but that one they didn't take it to fix it until now and that one it can cause any accident anytime cause every time that table can push her under the chair and that one can cause serious injuries.

Apart from machinery that was not serviced, it was further reported that some of the machinery in manufacturing industries were old and needed to be replaced. A worker in one of the manufacturing industries reported the hazard and the need for the machines to be replaced. The worker said:

> GW 8: The machines, I think eh, to my, my idea neh, I think the machine is old enough like eh, for an example I can say Jumbo neh, eh, we produce but sometimes the machine is not running in the good progress, the, the, I think the tools and the material that they use is no longer good. They need to have, eh, another one to use.

The findings indicate that workers in the manufacturing industries of Polokwane are exposed to various hazards in the physical work environment. As the physical work environment is where workers spend most of their time executing their duties, the findings reveals that machinery and other equipment, noise, manual handling of heavy objects, and chemicals are major hazards.

Workers in the manufacturing industries of Polokwane continue to operate faulty machines because production of goods must continue. Faulty machinery are machines that are not operating at full capacity, as required by their manufacturers. Workers had to improvise when using them, which is a hazard because an accident could happen anytime. Some of the workers use heavy chains that could snap and trap workers. This is an indication that production comes first and that the health and safety of workers is less important.

Machines are operated electronically and sometimes if they are faulty they can cause an explosion, fail to stop or switch itself “On or Off”, and any worker who is close is at risk of getting hurt. Faulty machinery accounts for a lot of occupational accidents globally.

Apart from faulty machinery, some manufacturing industries in the Polokwane municipality are still using old machinery. Old machines are production machines that have been utilised for a number of years and have not been replaced. Industry machines are either changed or modified to suit the growing production demands. The challenge with old machinery is that they are unable to cope with production pressure and are unfit to be operated.

Most old machines can only be operated by older workers and in cases where an older worker is not on duty, other workers who are unable to operate them are expected to operate them temporarily.

Management, in this case, appears to care less about how the work is done because less investment is allocated to resources. There are cases where workers are requested to complete work that they were not trained to do, and has led to an accident. Since most of these old machines are not technologically advanced, young workers find it difficult to operate them, with some using short-cuts to operate them, increasing the likelihood of accidents.

Mobile machinery are machines that are not static but are moved around to carry heavy loads in industries, sometimes to areas that are at heights. They remain a hazard in the manufacturing industries of the Polokwane municipality due to a lack of demarcated areas for them to move around in.

Most of the industries have mobile machinery and other equipment that generates a lot of noise, which makes the movement of these machines hazardous because workers are unable to hear as they approach. Workers are at risk of being crushed by mobile machinery or being struck by heavy objects carried by these mobile machines. Mobile machines also account for a number of fatal injuries in industries.

Forklifts are used to carry heavy loads as a way of maximising production and to avoid wasting time because it takes workers more time to do what a forklift can do in minutes. In the process of using forklifts, workers in the manufacturing industries of Polokwane are exposed to different hazards. Some forklifts are not serviced and since forklifts carry heavy loads and twist and turn frequently, the likelihood of workers being hit on a daily basis is high. This is because workers and forklifts utilise the same limited space within the production area. Heavy loads carried by forklifts fall at times and crush any objects in close proximity. Some forklifts have faulty tyres and move on uneven surfaces.

Lack of machinery maintenance remains a challenge because most of them are not serviced regularly. Machinery or equipment that is not serviced cannot operate as scheduled, which forces workers to compromise health and safety standards. With high production targets looming, workers are expected to perform without properly functioning machinery or equipment. Workers using machinery that is not regularly serviced risk being involved in accidents due to the machinery not operating properly.

Manufacturing industries use machines and equipment that generate a lot of noise. Although the noise that workers are exposed to is tolerable, the workers are unable to hear the moving machinery and loaders around their workplace. This increases the risk of the workers being hurt by moving machinery due to the level of noise in the work area.

Findings regarding machinery hazards in the manufacturing industries of the Polokwane municipality are similar to those reported by Chinniah (2015). Between the years 2000 and 2010, the author reported that occupational injuries due to machinery use accounted for injuries and deaths, with an average of 12 workers dying each year in Canada (Chinniah, 2015).

Zakaria, Mansor and Abdullar (2012) further reported that machineries in the workplace are the second biggest cause of accidents and account for 70 fatalities annually, globally. Forklifts are amongst the types of machineries mentioned by Zakaria, Mansor and Abdullar (2012) as they interact with pedestrian workers and sometimes with customers and visitors.

Operating a forklift is risky because it can overturn due to uneven surfaces. At times the drivers have to make quick turns. In addition, forklifts carry heavy loads to elevated areas. Pedestrian workers are at risk of injury due to congested working areas with restricted movement (Zakaria, Mansor & Abdullar, 2012).

Cranes and moving machinery are other types of dangerous machinery that pose a hazard to workers, as identified in the manufacturing industries of Polokwane. In a study by Lind (2008), workers were reported to have been injured by moving machinery due to the noise that was generated by the approaching machine, which the workers did not hear. Top, Adanur and Oz (2016) further reported on this challenge faced by workers regarding moving machinery, as the noise generated by machinery in sawmills, iron and steel and bricks manufacturing, resulted in occupational injuries because workers were unable to hear approaching moving machinery.

Major causes of machinery accidents are lockout/tagin, which can only be applied by trained workers. Failing to follow regulations and standard operating procedures can lead to accidents, and in some cases amputations. A similar study relating to finger amputation due to machinery accidents, which have been reported in some manufacturing industries of the Polokwane municipality, determined that workers did not perform a pre-inspection of the machinery before starting work (Dźwiarek & Latala, 2016). The study by Dźwiarek and Latala (2016) was conducted amongst Polish workers and, according to health and safety regulations, workers should do lockout/tagin before doing any machinery maintenance. One worker attempted to do maintenance on a machine that was on standby without lockout and the machine became activated, resulting in an injury. A similar study relating to hand amputation and failing to lockout a machine was conducted in different industries of the Canadian Province of Quebec, and reported 33 accidents (Chinniah, 2015).

Poisson and Chinniah (2016) investigated the lockout/tagin systems in a sawmill industry in Canada and discovered that the process of hazard identification was not done properly. These findings are consistent with what was reported in the manufacturing industries of the Polokwane municipality where lockout was not applied and a worker lost his fingers.

Lockout related accidents were reported to have caused 624 deaths in the USA (Bulzacchelli, Vernick, Sorock Webster & Lees, 2008), 88 accidents in France (Blaise & Welitz, 2010) and 33 deaths in Finland (Lind, 2008). Workers who are exposed to faulty machinery and those who do follow the correct work procedures are at risk of injuries or death (Bluff, 2014).

Old machinery has a tendency to break down often, leading to workers having to fix them continuously. Fixing of machinery exposes workers to moving parts, sharp objects and cutting blades (Poisson & Chinniah, 2016). Every year that an old machine is kept, the chances of occupational accidents increases. Most workers experience accidents due to old machinery that cannot cope with the production pace (Baker, Day, Stephan, Voaklander, Ozanne-Smith, Dosman & Hagel, 2008).

The current study reported that machinery is another cause of accidents in the manufacturing industries of Polokwane. Dźwiarek and Latala (2016) further indicated the risks associated with operating of old machinery when they reported that, whilst operating old machinery, workers are expected to remove debris stuck in the operating machine, or at times have to position certain material that is stuck in the machines. Workers are then supposed to move closer to the machines and risk being trapped and caught by moving blades or chains. In Switzerland and Finland, injury and death have been reported in workers who were in close proximity to operating machinery with rotating blades and chains, after coming into contact with the machines (Lind, 2008).

- Sub-theme 4.3.1.2: Existing physical hazards identified in the work environment

Workers also reported physical hazards as a challenge for them in the workplace. Physical hazards like noise in the workplace expose workers to risks as indicated by one worker who said:

> GW 9: … that person did not see it because that is where they were blasting… where there was a lot of noise so it reversed and drove over him and he passed away… we took almost 2 weeks without working.

In addition to what the worker (GW 9) reported, another worker from a manufacturing industry in the Polokwane municipality further said:

> GW 4: … because there is always noise here, some machines are different, there are others used for cutting wires and they make a lot of noise so maybe a forklift might hit me while reversing unintentionally or maybe the TLB might be reversing, you are passing and other machines are making noise and it hits you

Bricks were identified as another physical hazard in the workplace that are a source of occupational injuries, especially because workers use their hands to sort and pack them.

One worker reported that:

> GW 7: Yes, we experience injuries in the sorting area because they use hands for packing ….

The worker (GW 7) went further to say:

> GW 7: … when they put the bricks there is a high possibility that they might fall and injure our workers… is like if they are working you find that there is someone is right here and someone right there all of them they are putting the bricks over to the conveyer so you will find that someone when he put the bricks maybe he didn't put it well then it falls and cause an injury but …. erh time-to-time that happens in this factory

Workers in the manufacturing industries of the Polokwane municipality use their hands to sort and carry heavy objects like rocks, bricks, wood products and steel. Manual sorting and carrying of such hazardous material can lead to temporary or permanent disability of workers.

Workers are in danger of physical harm like musculoskeletal disorders, hand injuries, lacerations and skin punctures. Some workers are supposed to sort these hazardous materials while they are transported on conveyer belts. This also poses a risk as they are close to the conveyer belt, which is also hazardous.

Frequent bending and twisting of workers as they sort and pack the finished products exposes them to bodily harm that can become permanent, depending on the frequency and duration of the exposure.

Kadiri, Nden, Avre, Oladipo, Edom, Samuel and Ananso (2014) reported similar findings regarding exposure to high noise levels due to heavy equipment, leading to noise induced hearing loss. In most Ethiopian manufacturing industries, workers using their bare hands experienced hand injuries like broken fingers, cuts and abrasions (Aderaw, Engdaw & Tadesse, 2011). Khanzode, Maiti and Ray (2012) reported that manual handling of material at work accounted for most occupational injuries, leading to hand injuries, musculoskeletal disorders and ankle sprains. Amongst warehouse industry workers in Saudi Arabia, Basahel (2015) found that the majority of workers performed repetitive lifting of objects by hand, leading to lower back pain. Occupational hand injuries are a global concern. Out of the 80 000 occupational accidents reported in Turkey per annum, 18 000 are hand injuries (Serinken, Karcioglu & Sener, 2008).

- Sub-theme 4.3.1.3 Existing chemical hazards identified in the work environment

Most of the manufacturing industries in the Polokwane municipality use chemicals to produce their goods. In most of these manufacturing industries workers reported exposure to chemicals on a daily basis.

A worker working with chemicals on a daily basis indicated that:

> GW 8: Yes, we experience such problems, especially somebody like me. Sometimes we use this thing caustic; caustic soda. It is in the form of flakes so it turns into powder or fumes and they sometimes come into contact with the skin then cause skin irritation.

When one worker, when asked about chemical exposure at work, responded by saying:

> GW 9: …what is more dangerous is this caustic before it is mixed with water, it is still powder that then releases dust, that is what causes the problem. Another thing is ammonia, ammonia is the one that, eish, it penetrates the mask you have put on.

One worker reported exposure to chemicals, despite using PPE:

> GW 7: … They provide us with gloves but now the chemical penetrate through or sometimes the respirators are not of the correct size that covers only one side so the chemical dust sometimes penetrate and burns our faces.

One manufacturing industry worker explained how they are exposed to ammonia in the workplace:

> *GW 10:* Another thing is ammonia, ammonia is the one that, eish, it penetrates the mask you have put on.

Chemical exposure amongst workers in the manufacturing industries of the Polokwane municipality is a concern because of the effects due to such exposure. Most manufacturing industries in the Polokwane municipality use chemicals as part of production. Thus, most workers in the manufacturing industries of the Polokwane municipality are exposed to chemicals daily and the protective equipment supplied to them is insufficient. Chemicals enter the body either through inhalation, ingestion or absorption and some workers either inhale or absorb them during work. Chemicals that enter the human body are stored in different parts of the body and the results, depending on the dose, could cause permanent disorders like damage to the nervous system, and certain organs like kidneys, liver and lungs.

Chemicals were reported to be one of the hazards that led to some occupational accidents in the manufacturing industries of the Polokwane municipality. Zhang and Zheng (2012) reported on the risks of chemical use in industries if not handled properly. After assessing the patterns and trends in injuries due to chemicals, Mannan, O'Connor and Keren (2009) reported that manufacturing industries accounted for the largest number of injuries due to chemical exposure.

Dust and acids were reported as the most chemicals workers are exposed to in manufacturing industries. This supports what one of the participants said about chemical dust exposure.

- Sub-theme 4.3.1.4 Existing hazards experienced by working at heights

The findings of the study revealed that there were some industries that perform work at heights. Performing work at heights refers to work that is conducted at elevated areas. A number of hazards were identified. Workers reported the risks and accidents that they had experienced whilst working at heights. The major hazard reported was falling from heights and some workers got injured due to falling.

A worker got injured by falling, as reported by one co-worker:

> GW 8: Let me start by the fracture that, the one we have last year. Eh, the fall from above on top of the stairs and the problem I realise is that we don't have proper safety measure for that.

Another worker also reported what happened to a co-worker while working at a height:

> GW 6: We have another guy who was floor down from the up to down. That area is too dangerous to work at …. If there was protection the guy would not fall.

The reason workers fall from heights is that there are no control measures like handrails or barricades.

A worker who works at heights indicated the challenges of working at heights:

> GW 11: The problem is the, the control measure of that, is not that, really possible to can do it. And it caused by, you see, we those stairs, caused by some twist and bow. The guy, is like a table, the stair is like a table, here is at the back there is nothing to prevent them from falling here. Then they move forth and back and when they move back they hook onto the planks and fall off.

Another concerned worker summarised working at heights by saying:

> GW 12: Eish sometimes we don't have a choice because if you can see, we have to carry that load up those stairs because the space is too small for a forklift. When you arrive at the top you are tired but you must continue to work otherwise the ticket stops when you stop.

Work at heights exposes workers to risks like falling from heights, workers being hit by falling objects and musculoskeletal disorders due to carrying heavy objects up and down the stairs. This is because work being conducted at elevated places requires the area to have protective barriers to prevent falls, surfaces should be even, and there should be either an elevator, stairs guarded by rails or a lift.

The highest number of occupational injuries across all industries is due to falls from heights. In the manufacturing industries of Polokwane, workers who work at heights are not protected against falls as there are no handrails or guardrails.

Carrying heavy loads up the stairs manually exposes workers to back, hand and head injuries because, at times, the workers' movements are restricted by the load they carry. They sometimes do not have a clear view of where they are going, which could lead to them hitting other objects along the way. Carrying heavy objects also includes twisting and turning and the possibility of associated musculoskeletal disorders is high.

There are findings from other studies similar to those found in the manufacturing industries of Polokwane that indicate the risks and effects of working at heights. The USA city of Washington reported the highest number of workers falling from heights amongst the Drywall carpentry workers. It was reported that 66% of injuries were due to falls from heights (Schoenfisch, Lipscomb, Cameron, Adams & Silverstein, 2014). In New Jersey, USA, the seriousness of falls from working at heights was evident by the report that 33% of such accidents resulted in serious injuries. Lack of training regarding working at heights was reported as the cause of the injuries (Borjan, Patel, Lefkowitz, Campbell & Lumia, 2016).

In the Japanese construction industry, injuries due to falling from heights were reported to cause approximately 40% of deaths (OHDO, HINO & TAKANASHI, 2014). Falling from heights was also reported to have caused on average 25 deaths in the Netherlands. This figure accounted for at least 28% of all occupational accidents investigated across different industries in that country (Aneziris, Papazoglou, Baksteen, Mud, Ale, Ballemy, Hale, Bloemhoff, Pest & Oh, 2008). Similar concerns were raised in Malaysia where most occupational injuries were reported to be falls from heights.

A 13-year review of occupational injuries was conducted and the findings indicated huge risks associated with working at heights (Ganesh & Krishnan, 2016). Generally, falls from heights was recorded as the leading cause of deaths amongst workers, resulting in this type of work hazard being a huge public health concern (Nadhim, Hon, Xia, Steward & Fang 2016).

4.3.5.6 Theme 4.3.2. Descriptions related to workers' conduct during performance of tasks and the consequences thereof

The current study further found that the conduct of workers was hazardous to fellow workers and they are unable to perform certain tasks in a satisfactory manner. Most workers were reported to be negligent and did not follow the prescribed operating procedures. These findings were supported by the following sub-themes:

- Sub-theme 4.3.2.1. An explanation that workers are negligent during execution of their duties

It was established that workers themselves are a cause of occupational accidents due to the way they conduct themselves at work. This was evident when one of the workers said:

> GW 10: …. sometimes the accidents we experience are caused by our careless workers.

One manufacturing company experienced a fire that was caused by a negligent worker. A fellow worker reported the cause of the fire by saying:

> GW 6: …It was negligence on the part of the mixer, he might have forgotten to switch off the gas cylinder … I am not sure if he switched them off but I think he might not have done that because the paraffin was overflowing in the machine and it caught fire.

Some workers were reported to be working without protective equipment even though they knew it was dangerous to work under such conditions without protecting themselves. They knew what they were supposed to do but decided to do the opposite.

A worker on site who observed the behaviour reported that:

> GW 11: For them to do the work properly they had to get inside the smoke ducting and the two men went there without their safety equipment's and they got injured to an extent whereby they were hospitalised for months.

Sometimes workers execute duties that they are not supposed to and end up causing accidents that affect either themselves or fellow workers. A worker who operated a machine without permission caused an accident because he did not know how to operate the machine.

This is explained by a fellow worker who said:

> GW 10: … here at work the injuries that I have seen, a person was caught up in a roller machine …. that person was not trained for using that machine at that time… for painting steel…actually he just saw people using it but he had never used it… used it; he wanted to practise using that machine, how it works. That is the problem I think he had. He was supposed to ask someone who is qualified for working with that machine to paint.

Another negligent act by workers is when they do not follow standard operating procedures and think that a task may be easy to perform, resulting in an accident. A fellow worker reported one incident where a worker got injured because of negligent behaviour.

The worker reported this:

> GW 7: … And the other amputation was, some of the machine are technologically eh, this automation machines, they use sensors, laser beams and the machine was broken at that time and the guy was trying to set the laser cause he could not see the material, it was loose, so instead of doing lockout or stopping the machine completely the guy tried to test the laser while the machine is ON, then it sensed, it, it, he shift it off and it got activated and cut his two fingers. It means that the, he was doing maintenance while the machine was still in operation.

Most workers in the Polokwane municipality manufacturing industry felt uncomfortable with the conduct of their fellow workers, and felt that they did not conduct themselves in a satisfactory manner. A negligent worker is one who conducts an unsafe act at the workplace by not following the correct work procedures, as indicated by health and safety regulations. Being negligent does not only endanger one's own life but even the health and safety of others who may be affected by the consequences of being negligent.

A worker who becomes careless even though there are standard operating procedures indicates that there may be a lack of supervision, the worker might be lacking knowledge regarding the effects of being careless, or the worker may be affected by other psychological factors that are transferred to the workplace.

In some cases, workers are negligent or careless because they are dissatisfied with their working conditions. An occupational accident that is due to carelessness or negligence does not only affect the section in which it happened but the whole industry. There are reported cases in the Polokwane municipality manufacturing industries where there was shut down due to an accident.

Some workers in the manufacturing industries of the Polokwane municipality were reported to be executing their duties in an unsafe manner, posing a danger to other workers. Similar findings were reported by Hussin, Jusoff and Kong (2008) who reported that the majority of workers in the food manufacturing industries of Malaysia experienced occupational accidents due to human error.

Some of the workers in those industries conducted themselves in a negligent manner, resulting in accidents where workers got injured. Furthermore, Reyes, de la Riva Maldonado, Woocay and de la O (2015) reported negligence as a major cause of head injuries amongst workers in the automotive manufacturing industries of Mexico. Negligent workers used machinery and related equipment in such a manner that accidents were unavoidable.

According to Reyes-Martinez, Maldonado-Macias and Prado-Leon (2012), during work most workers were either not totally focussed, were using cell phones whilst operating machinery, were acting in an ill-disciplined manner, or were working with their hand jewellery on. Some errors that the authors reported were found amongst workers who were not following safety rules, were handling tools improperly, and were working without PPE.

- Sub-theme 4.3.2.2 Ability versus inability to execute tasks leading to hazards affecting fellow workers

The majority of workers in the manufacturing industries of Polokwane were unable to perform their tasks as expected, resulting in some errors and injuries. Some had to be instructed on how to operate certain machinery and tools, and how to handle certain chemical substances.

Other workers reported that they sometimes move from one section to the other without the permission of the supervisor. Some workers caused a fire at an industry because they did not know the correct levels to fill a machine with a certain substance, which led to the machine overflowing and causing a huge fire.

A worker who experienced a colleague acting in a manner that indicated incompetence said:

> GW 7: I really do not know why that worker was could do that. We all know that the machine he was using is powerful, yah, we use it to cut very hard objects but he just put his finger in. The supervisor asked him and he did not have an answer. He was lucky it did not cut his finger.

Another worker was surprised why a co-worker who was unable to perform a task he was employed to do. She said:

> GW 9: I don't think that person was supposed to be working here, imagine if that forklift had injured him. How can one carry such a heavy and still move where forklifts drive? That load was supposed to be carried by the forklift and he injured an innocent worker.

Regarding the cause of the fire, one of the workers said:

> GW 8: We were on our night shift and suddenly we saw fire. We could see that the paraffin was overflowing and that person was not supposed to work on that machine. We have levels that show how much paraffin we should fill in but he just poured until it overflowed and once the machine got heat, it started the fire. A large portion of the company was burnt, even the machine.

Regarding the reported injury to a worker caused by co-worker, one worker responded by saying:

> GW 10: Yah, it was bad. We were all watching as he was treated and taken to the clinic. The other worker was using a machine used for plaining and a plank was stuck and instead of him doing lockout, he tried to push the plank and the plank hit that worker very bad on the head. There was blood, eish.

Another workers summarised the situation like this:

> GW 10: You watch him, immediately when you move an accident happen because that guy is not sure of some of the other stuffs.

A worker's inability to execute duties as expected increases the likelihood of causing harm to fellow workers because at times they do not operate machinery according to the operating procedures.

Since it is the responsibility of workers to ensure a healthy and safe working environment, negligent workers are a danger because they could mix reactive chemicals with explosives and cause a fire or operate a machine even if it is dangerous to operate it. The results of such actions are costly to industries because, if workers are injured, they require compensation, meaning lost hours of production as they receive treatment. The company can also be shut down due to the negligence of incompetent workers.

Similar findings were reported by Hussin, Jusoff and Kong (2008) who reported that the majority of workers in the food manufacturing industries of Malaysia experienced occupational accidents due to human error. Some of the workers in those industries conducted themselves in a negligent manner, which led to accidents where workers got injured.

Furthermore, Reyes, de la Riva Maldonado, Woocay and de la O (2015) reported negligence as a major cause of head injuries amongst workers in the automotive manufacturing industries of Mexico. Negligent workers used machinery and related equipment in such a manner that accidents were unavoidable.

According to Reyes-Martinez, Maldonado-Macias and Prado-Leon (2012), during work, most workers were either not totally focussed, were using cell phones whilst operating machinery, were acting in an ill-disciplined manner, or were working with their hand jewellery on. Some errors that the authors reported were found amongst workers who were not following safety rules, were handling tools improperly and were working without PPE.

- Sub-theme 4.3.2.3: Lack of versus existence of safety awareness by workers and challenges thereof

According to the findings of this study, workers reported that some of their colleagues displayed lack of awareness about health and safety in their workplaces. The lack of awareness by such workers included performing their duties in an unsafe manner without knowing the risks associated with their conduct. Such unsafe acts include operating machines without taking the required care, not following standard operating procedures, and walking in prohibited areas. Most of these workers in the manufacturing industries of Polokwane work with or near high scale machines. Some of them move around areas with mobile machinery where production takes place and are exposed to a number of hazards. This is evident from what workers reported regarding lack of safety awareness.

A reported lack of awareness by a fellow worker is described below:

> GW 9: The thing is, when the stone fell, the cause was that the bin was too full. The excavator operator did not use safety when they were putting in the stones inside the bin. They just put stones until it was too full, then the stone fell

A participant reported how an accident occurred that was avoidable:

> GW 11: … but I am aware of the incident where a certain person had a serious fracture to their leg due to mobile equipment… it was… he was sitting in a certain area and people were moving the mobile equipment not aware that he is sitting there and they actually drove over his feet and his legs so he had a very serious fracture there

Challenges faced by industries regarding lack of awareness by workers is explained by one worker who said:

> GW 10: What can we say, we just have continue working and hope that nothing happens. These people they just send them here and they expect us to teach them how to work. We have to be alert all the time otherwise we are in danger of injuries.

A worker expressed frustration regarding working with people who endanger their health:

> GW 12: Imagine a bolt or cutting disk coming towards your face because somebody used a machine with loose bolts. It happened once whilst we were cutting steel and this guy did not fasten the grinder correctly. That thing, a grinder makes noise and it is powerful, you cannot see that the disk is loose.

Lack of awareness about health and safety regulations and acting in a manner that is unsafe compromises the health and safety of the whole industry. Workers that act in an unsafe manner put their health and safety and that of their fellow workers in danger. The industry has an increased likelihood of suffering loss due to broken equipment and machinery, loss of working hours, and compensation to harmed workers.

These findings are corroborated by Hallowell (2010) who reported that workers in a construction site of a Nigerian state were responsible for occupational accidents due to lack of awareness about the tasks on hand and the worksite. Amongst the wood chippers in the Italian industries, Bagagiolo, Laurendi and Cavallo (2017) found that machine operators removed obstructing objects whilst the machines were still running. Although the operators were exposed to rotating machinery, their lack of awareness resulted in accidents.

Most workers violate operating procedures, as reported in the US mining sector where workers responsible for maintenance and repair of equipment did not know how the work is done, resulting in fatalities (Reardon, Heberger & Dempsey, 2014). Reyes et al. (2015) identified deviations from operating procedures or organisational safety by workers as a contributing factor towards hand injuries in the automotive industries of Mexico.

4.3.5.7 Theme 4.3.3: Training related to performance of duties by workers

Training of workers relating to how they should execute their duties was discovered to be lacking. At the workplace, training regarding health and safety means workers are able to understand how they should avoid dangerous and unlawful acts. It was determined that workers lacked training to enable them to perform their duties. In addition, those who had been trained had insufficient training.

- Sub-theme 4.3.3.1: Lack of on-the-job training for workers leading to poor performance

Most workers performed their duties without knowledge of how machinery is operated. Without training, workers are unable to operate some of the machines.

Workers indicated this as a cause of occupational accidents, as reported by one worker who said:

> GW 9: I think most, let me say, most of these accidents that happened is caused because some of the, most of the people we don't get training. I think if the company can give the employees a proper training and PPE I think will get better.

Training of workers was found to be a challenge that management could not sort out. In some cases, certain untrained workers were compromised as they are expected to do work they are not trained to do because work should continue.

A worker reported that:

> GW 13: …Eh, we usually, you see, they, they … sometimes we short of staff and we use somebody next to the guy who usually works there, show him some, for some few minutes and say this is working like this and eventually the guy got caught by some moving belts and get those lacerations

This was further confirmed by another worker who indicated that:

> GW 7: And the problem, the other problem is that we don't have, we don't get time to do training like in-house training because of shortage of staff.

A concerned worker summarised the issue of lack of training by indicating that:

> GW 5: …Like I said I think maybe people need to get training according to my idea.

It was determined in some manufacturing industries that even supervisors were not trained. This was reported by a worker who said:

> GW 11: …But the other problem is that the supervisors have not undergone any safety training themselves and it becomes difficult to tell us what to do. Accidents will always happen.

Lack of training amongst workers is one of the leading causes of accidents in the workplace. Workers are unable to manage safety practices, like how to perform certain duties. Workers sometimes do not see the value of attending any meetings or activities related to health and safety training. It is risky to allow workers to operate machinery without proper training, as reported in one manufacturing industry of the Polokwane municipality.

Workers who are not trained for a specific task should not be expected to perform that task because the responsible person is not on duty. Workers are supposed to understand their roles and responsibilities to prevent an increase in risky behaviour. Such untrained workers become ineffective and cause most industrial accidents.

Zhang and Zheng (2012) reported similar findings due to lack of training. They reported that attitude of management towards health and safety, coupled with low investment, accounted for most occupational accidents due to chemical exposures. Workers lacked knowledge on how to protect themselves against harm caused by exposure; they were unable to foresee the effect of their unsafe actions and also how to avoid contact with chemicals.

It was further reported by Zakaria, Mansor and Abdullah (2012) that lack of knowledge and skills due to shortage of training limits workers' ability to execute their duties, especially those related to hazardous substances and machinery. Bluff (2014) reported that workers who are not trained to perform certain tasks are unable to avoid certain occupational accidents like those using machinery. This is compounded if the machinery is faulty and untrained workers are unable to operate it.

- Sub-theme 4.3.3.2: Insufficient on-the-job training for workers reported

In some manufacturing industries of the Polokwane municipality workers reported that they were offered training in the form of small talks in the morning once per week. The small talks discussed what is expected of them; however, they were not task-specific. Through these talks, workers understood that they should work and produce; however, there were still some gaps regarding how they should execute their duties.

The information they receive was reported to be insufficient because different sections of their industries perform different duties. Reported responses from some of the workers indicate how such training affects their work.

This is what one worker said:

> GW 6: That worker was asked to come to our section and operate the machine without knowledge. That was because the main operator was absent. What they did was to offer him a short lesson how the machine operates and they watched him use it, then they left.

One worker reported dissatisfaction with insufficient training:

> GW 8: They offer us a training but, eish, it is not enough because sometimes it is not according to how I work. We just listen and sometimes you find other workers asking questions that our supervisors do not answer, when we go back to work we do not know what to do.

That was further supported by one worker who said:

> GW 5: Some of, some of the, like the operator they have a training and the other job title they don't get it, they didn't get a training so according to my idea I think all of us we need to have a training which every job that we are doing cause of the time people get injured.

To indicate that workers are offered insufficient training, a supervisor confirmed by saying:

> S 4: We just appoint them and what I do I just go through with them the process of the safety procedure there.

A worker supported what the supervisor indicated by saying:

> GW 8: … we have a problem when they coming to the packer they just told you 'you pack this size like this and this'. We don't have that proper training you know, how to hold the board, how to pack those kinds of things cause most of people I think those who get injured is from packer people.

Insufficient training sometimes gives management the false impression that workers are able to perform certain duties. Manufacturing industries expose workers to different hazards with huge risks, and proper and adequate training is required. Most managers focus on production and forget that production goes with safety. Insufficient training is similar in risk to lack of training because in both cases workers are unable to execute their duties according to the required standards. There is always harm or potential harm to workers if on-the-job training that addresses the skills needs and knowledge of workers is considered.

Gulhan, Mustafa and Fusun (2012) reported similar findings amongst workers in a metal industry of Ankara, Turkey. They reported that insufficient training of workers accounted for most occupational accidents. Workers were not trained at a level that enabled them to perform certain duties. This was despite workers working longer daily shifts of 9 hours 30 minutes in a hazardous industry dealing with heavy metals and machinery.

Işik and Atasoylu (2017) further indicated that training of workers should be intensive and comprehensive to address the challenges in the workplace.

The authors indicated that workers in a North Cyprus industry reported that the type of health and safety training offered was just a day seminar and was insufficient as it did not help them gain the required knowledge. Competent workers are those who are able to identify risks, assess them and be able to take the necessary action. This could be achieved through proper training of the working force (Järvis & Tint, 2009).

- Sub-theme 4.3.3.3: Inability of workers to transfer learnt skills leading to role conflict

Some workers in the manufacturing industries of the Polokwane municipality reported that after training they were unable to apply the learnt knowledge and skills in the workplace. Workers indicated that sometimes the type of training that is offered is too broad and that they are unable to understand how it links with their job. Some of them end up being frustrated and unable to differentiate between tasks they are expected to perform because they attended training. Some of them are even scared of performing dual duties as per expectations because that makes them vulnerable to multiple hazards.

Being offered training that does not suit your job description was reported by one workers who said:

> GW 8: …we attended some one-day training offered by one guy but to some of us it meant nothing. I mean how do you teach us about things that we do not understand? When I start operating the forklift I must know how it is done. The guy just gave us too much information and some books to read but I do not understand how to use the information now.

Another worker from a different manufacturing industry indicated how irrelevant the training was:

> GW 10: According to my view, most of us do not know how to use the information. I mean the supervisor try to teach us how to work but when it is time to do that we end up doing something different and the company lost money. When you say to us this is how it should work and I am not using that, what does it mean? The supervisor should go for training first and know what we do, that is my thinking.

A frustrated worker related his frustrations by saying?

> GW 11: There are times where I feel like just sleeping or going home … or not coming to work. They blame us if things go wrong but how are we supposed to know? These new machines need training, too much training (indicates by hands like throwing something away).

Performing dual duties places workers in a difficult position because they are expected to work, irrespective of the two tasks:

> GW 13: In my case, what I do, I sort the products according to their sizes but sometimes I have to cut them according to sizes. Both times I deal with sizes but I become confused that what am I supposed to do now. I sometimes think I am sorting and end up cutting similar sizes and the supervisor become angry. You see when you are trained you are trained to do certain work that you think you know, now you do something else and you do mistakes.

Since training provides workers with knowledge and skills, the type of training offered should consider the level of knowledge and skills that workers require.

After training, workers are expected to apply knowledge and skills to the work environment. Training that is not linked to the type of work environment workers work under is a recipe for failure; it should not be different to the workplace. Failure to link training with the work environment could lead to difficulties when workers are expected to transfer what was learnt to the work environment. When workers fail to apply new knowledge and skills imparted to them during training, it becomes costly to industries and is a wasteful use of training resources.

Munna and Suring (2011) reported the repercussions of not linking training with the workplace, which are a demotivated and less productive workforce. This is due to the way that the training is improperly designed. Learning designs that are improperly designed make it difficult for workers to assimilate information, understand it and then transfer the skills to the work environment (Hutchings, 2009).

According to Ruhizan, Faizal, Ridzwan, Bekri, Arif, Mahazir and Ashikin (2014), workers are only able to transfer information gained to their work environment if the training is designed in such a way that both the training content and the work environment are linked. Faizal, Saiful, Bekri, Jamil, Amiruddin, Ruhizan and Arasinah (2017) found that very little knowledge and skills acquired during training is transferred to the work environment. The rest is lost because it is not relevant to the type of work performed. They indicated that a gap between what workers learnt and the demands at work are the determining factors of the workers' inability to transfer learnt information.

- Sub-theme 4.3.3.4: Experienced workers using their long service as a form of training

Some workers in the manufacturing industries of Polokwane reported that there is no need for them to be offered on-the-job training because they know how to perform their duties. They cited their long years of working at the same manufacturing industries as serving as training. They reported that training will not assist them in any way because training takes time and it is too broad and is usually not specific to what they do. They view training workshops as a way of wasting company resources.

Long service work serves as experience and thus training is not required, as justified by one worker who said:

> GW 13: I started using this machine long time ago…in fact it was before this one was bought. When you work with one thing for long it becomes your game, your thing. I know how to make it work even if it breaks down. This thing of training and training does not work for some of us. Tell me, if you cook porridge every day do you need people to tell you how to cook? No. Our grandfathers built railway lines without training and trains still use them today.

Another worker who does not see the importance of training due to his long service said:

> GW 14: Yes, we had training even though it was too broad but me, I do not need training. I have a driver's license and have just renewed it so operating that forklift is like driving a car, the more you drive the more experience you have. These people who train are just here for money. Nobody said to me this is how a forklift works, it is through my experience and I like it.

Another worker also thought long service is an advantage.

> GW 7: They are very much experienced because some of them have so many years working in this company and some of them they get rewards.

An experienced worker reported why it is not necessary to train them.

> GW 10: It is a waste of money to train some of us, very soon we might leave and go on pension or another company, like in the mines, call you to join them. those of us with experience should just be left alone when they train these young ones. They will save a lot of money because training does not work, experience does.

Experience is regarded as the 'best teacher' as workers are able to utilise certain materials and machinery carefully. Most workers who have worked in one area within an industry for a long period are able to be patient with their work and are able to be more productive as compared to those who are less experienced, as the less experienced workers tend to be inpatient with how production is done. Work experience tends to save industries a lot of resources because experienced workers are able to utilise resources profitably.

Most occupational accidents are reported to be amongst those who are less experienced (Nasab, Ghofranipour, Kazemnejad, Khavanin & Tavakoli, 2009). The challenge with workers who depend only on experience is that they might miss vital information regarding the use of the latest technology and new substances that an industry utilises. Similar findings where experienced workers were reported to be involved in less occupational accidents were reported by Jovanovic, Arandelovic and Jovanovic (2004) and Adebola (2014). Such experienced workers accumulate more knowledge and skills and are more patient with their work. Nasab, Ghofranipour, Kazemnejad, Khavanin and Tavakoli (2009) reported that experienced workers display acceptable attitudes towards health and safety even if they did not have formal training regarding their work.

Performing certain tasks offers them much needed knowledge and skills. Furthermore, Basha and Maiti (2013) found that experienced workers tend to be more safety conscious as compared to inexperienced workers. They are able to avoid risky behaviours due to their years of work.

4.3.5.8 Theme 4.3.4: Report on provision, utilisation and compliance to PPE described

The provision, use and relevance of PPE in the manufacturing industries of the Polokwane municipality were reported to be a major concern. Workers in some manufacturing industries were provided with PPE but did not use it whilst working. Workers in high risk areas of the manufacturing industries of Polokwane use PPE that is not relevant to what they are exposed to. Workers are supposed to be provided with the correct PPE annually or when PPE has worn out. Provision of relevant PPE to workers is a big challenge in the manufacturing industries of the Polokwane municipality. The majority of workers know that they are being provided with incorrect PPE but they continue to use it.

- Sub-theme 4.3.4.1: Insufficient provision of PPE to workers reported

There are cases where the employer provided workers with PPE; however, it was adequate to protect workers as they execute their duties.

One worker who was not happy with the PPE being provided to them reported that:

> GW 8: …it's all the same, except the guy on very excessive noise areas… noisy areas… he wears like… he puts the big mask, even though they are not enough

The findings regarding provision of PPE to workers revealed that there are gaps. A worker confirmed the gaps in the provision of PPE to workers by explaining that:

> GW 5: For the vibrations we don't have measures. For the dust we have and for the noise we have but it is not enough, for the Jaw, the guy is working on the Jaw but it's more like what else can you do… you're just thinking, what else can you do

A worker who observed workers using their own clothes due to insufficient supply of PPE reported that:

> GW 4: They don't, I can say they don't, cause when, even now if you go inside the mill they can get some of the people, employees they just wear their own clothes … because the clothes that they were given is no longer good. So they use their own clothes, meaning I can say they don't give us a PPE, enough PPE. We struggle when it comes to PPE.

Another worker reported that, at their workplace, there is not enough PPE for workers.

> GW 3: Our workers don't get proper clothing, affordable and effective clothing.

Another worker explained the situation at their industry where workers are not supplied with proper PPE, which led to some of the workers using their own clothes as PPE. In some cases, workers even buy their own PPE.

The worker related this by saying:

> GW 7: Our workers don't get proper clothing, affordable and effective clothing…Ya, some of them they buy some of them they use their own, their own clothes …They just wear, they, if they don't have a work suit, they just wear their own clothes.

It is against the law to let workers buy their own PPE or use their own clothes as a means of protection against occupational hazards. The health effects after exposure to some of the hazards are costly to an industry as the industry will be classified as a hazardous workplace and their annual fee are then increased.

Chemical exposure in the workplace could be through inhalation, ingestion or absorption. Workers whose work involves chemicals should be protected against any exposure if such substances cannot be eliminated or replaced. Exposure during work is in the form of spilled chemicals, fumes, vapour or mist. If workers in such working environments are not offered PPE for the duration of their work, they have the potential to develop skin burns, irritation of the respiratory tract and sensory loss. In most cases the symptoms are discovered years after exposure, after workers have left their place of work.

High-powered machines have an increased likelihood of trapping workers and crashing them, cutting their hands and fingers or legs. Proper PPE for workers working with high-powered machines protects workers against such injuries. Sharps due to working with steel, iron or glass exposes workers to punctures and laceration if there is no PPE for workers working under such conditions. Most workers working within such areas in the manufacturing industries of the Polokwane municipality are those in iron and steel manufacturing and glass cutting and sizing. It is the duty of the employer to provide workers with PPE and workers are not supposed to buy or bring their own clothes from home. Failure to provide workers with sufficient PPE exposes them to different risks like workers who work in a noisy area without PPE that could prevent exposure to noise.

Workers who are frequently exposed to noise have an increased likelihood of developing noise-induced-hearing loss. If the employer is unable to minimise noise through engineering of equipment, it is better to provide them with sufficient, relevant PPE.

There are workers who work with vibrating machines and others who work on vibrating surfaces without adequate protection. The risks of too much exposure to vibrations; be it hand-arm vibration or whole-body vibration, could lead to workers developing vibration syndrome where their bodies get used to vibrations and they develop conditions like tremors.

Lombardi, Verma, Brennan and Perry (2009) reported similar findings, where workers from different industries were provided with insufficient eye-wear. Most of the workers within those industries indicated that insufficient provision of PPE was the biggest barrier to them using PPE during work,

which had an effect on job performance (Wagner, Kim & Gordon, 2013). Amongst medical waste industry workers in Bangladesh, insufficient PPE was reported as the main cause of occupational accidents because management of the industry could not afford proper PPE and opted to use any protective equipment that they could afford (Patwary, O'Hare & Sarker, 2012).

In one industry, workers had to purchase their own PPE because the one provided by their employer either did not fit or was insufficient (Onyebeke, Papazaharias, Freund, Dropkin, McCann, Sanchez, Hashim, Meyer, Lucchini & Zuckreman, 2016). Another finding amongst health workers indicated that lack of sufficient PPE led to non-compliance to health and safety regulations due to failure of management and poor work organisation. This prompted the workers working in risky conditions without sufficient PPE to offer their services only if PPE was appropriate and sufficient (Neves, Souza, Medeiros, Munari, Ribeiro & Tipple, 2011).

- Sub-theme 4.3.4.2 Incorrect PPE provision to workers reported

Employers were reported to offer their workers PPE as a means of protection against hazard exposures; however, the PPE being provided was not suitable for the task. A worker in one of the manufacturing industries reported that they were provided with PPE but it was incorrect.

This is what the workers reported:

> GW 10: Another thing is ammonia, ammonia is the one that, eish, it penetrates the mask you have put on…. What is provided to us are similar, they do not prevent ammonia from penetrating. Those who are working at stores are provided with the correct masks and it seems like they are protected but as for us, ahh, they don't prevent ammonia exposures.

Another worker also indicated the provision of incorrect PPE, exposing them to chemicals at the workplace, by saying:

> GW 12: They provide us with gloves but now the chemicals penetrate through or sometimes the respirators are not of the correct size that covers only one side so the chemical dust sometimes penetrate and burns our faces

In some instances, workers are provided with unsuitable PPE which also exposes them to the chemical substances they are working with. A statement by one worker bears testimony to that when the worker reported that:

> GW 7: … in the areas where we work they don't give us full-face masks but just ordinary masks…. We report time and again and they keep promising that they will provide us with full-face masks.

Another worker reported that although they are provided with PPE, it is not relevant to what they do:

> GW 6: where we work we need googles that cover the whole area next to our eyes but they just gave us this, these are spectacles and not googles. What if I am cutting and a piece of steel flies into my eye? At those ones are tight and they cover the whole part next to our eyes.

Failure by management to provide workers with relevant PPE means workers in the manufacturing industries of the Polokwane municipality continue to be exposed to different hazards like sharp objects, rocks, bricks, iron and steel, and chemicals. They continue to be exposed to such hazards because they have no alternative but to work.

Improper supply of PPE by management was reported among Taiwanese manufacturing industry workers (Cheng & Wu, 2013). The effects of supplying workers with improper PPE were reported as having exposed workers to chemicals and gas emissions (Aliyu & Saidu, 2011). This is consistent with what workers reported in the manufacturing industries of the Polokwane municipality who were exposed to chemical dust due to improper supply of PPE.

- Sub-theme 4.3.4.3: Lack of utilisation of provided PPE by workers outlined

Some of the occupational accidents were caused by workers who did not put on their PPE during work. A co-workers reported that even though in some cases they are provided with the correct PPE, workers do not put them on during work.

The co-worker reported that:

> GW 6: They don't use protective gloves, they just work bare-handed and they then get splinters from the pieces of timber there

In one incident workers inhaled gases from the workplace and had to be hospitalised because the workers did not wear the PPE. This what a co-worker observed:

> GW 8: Yes, inhalation and they just go to the hospital, maybe just, they stayed for two days and then they come back, they treat them

Even though PPE is provided to protect workers, some workers have reasons why they should not wear it, which is a risky conduct. A worker who observed other workers not putting on their PPE reported that:

> GW 14: Ya, some of them don't understand. The problem is that they say these are always their answers: They are too heavy, they are hot, I am not comfortable with it, or an, is. I am feeling more hot with this, that's, that's all sometimes some of the answers that they give the guys in the production

Another worker reported that workers chose when to put on PPE and when not to, despite the fact that there are associated risks. The worker said:

> GW 13: …they like to wear it when there is a lot of dust but normally it's things that we have to always wear so some have told themselves that dust since you cannot see dust with your eyes, then there is no dust… I think it's one of the other things which damage all of us as worker

Some of the workers prefer not wear PPE, even if it is provided and relevant. The fact that it is uncomfortable or slows workers down does not serve as an alternative protection against hazards. This is in violation with the health and safety regulations that prohibit workers from entering a workplace without proper PPE. This again indicates the level of supervision because no worker should be allowed to enter a work station without correct PPE. It could either be that the supervisors are lenient or are not monitoring the workers during work.

Findings similar to those found in the manufacturing industries of Polokwane were reported by Oginyi, Mbam, Bojei and James (2017) amongst rice mill workers in Nigeria. Even though workers were provided with PPE, the majority of them preferred to work without the protective equipment because they saw no reason for wearing it. In another study amongst refinery and petrochemical workers, Aliyu and Saidu (2011) reported that workers did not use protective equipment as it was uncomfortable and makes work difficult to perform. Workers further indicated that PPE decreases their performance.

- Sub-theme 4.3.4.4 No provision of PPE and protection to workers working in high risk areas reported

The results of this study also found that in some workplaces in the manufacturing industries of the Polokwane municipality, workers were not provided with PPE. Workers in some cases had to use their own clothes as a way of protection. Although it was discussed that most workers reported not being provided with PPE by their employers,

it was also evident from some workers that those that work in high risk areas are also not provided with PPE. High risk areas include areas where there are chemicals, dust, fumes, high-powered machinery, noisy areas and material with sharps. High-powered machines include those with rotating components, sheer points and pinch points. Material with sharps are those with sharp pointed ends like steel, iron and glass.

A worker describes the hazard of working at heights, with no PPE being provided to them:

> GW 6: work is difficult on top there, we work with things like pipes, steel pipes and rods and grinders. You have to be careful because one mistake, they might injure you or you can fall to the ground. We use our open hands but it makes work easy and faster.

A worker working at heights fell and had a fracture. This is described by one worker who said:

> GW 8: Eh, the fall from above on top of the stairs and the problem I realise is that we don't have proper safety measure for that. The guys have done induction on working on heights but the problem is the, the control measure of that, is not that, really possible to can do it at heights.

It was further explained by a worker who witnessed the accident who continued by saying:

> GW 8: The guy, is like a table, the stair is like a table, here is at the back there is nothing to prevent them from falling here. Then they move forth and back and when they move back they hook onto the planks and fall off

A concerned worker reported the risks they face while working at heights and even suggested some protective devices to ensure that they do not fall from heights. The worker said:

> GW 13: There are no barriers or any safety measures there. So but I was thinking of coming up with a measure of safety harness looking as if they can get belt and hook onto something above the top, but is still a process.

Sometimes those working at heights pose a danger to workers who are working at surface level. Due to the unavailability of rails, sometimes objects fall from above and those at the bottom could be injured.

A worker describes one scenario where objects fell even though nobody was hurt, it was a near-miss.

> GW 10: Falling and rolling objects… we get a lot of… the incidents of fall and rolling objects but luckily like I said it's near-misses. Our supervisor is always busy and is unable to be check on us

Workers who work at heights need protection like other workers. There should be protective devices like guard-rails for those who move up the stairs using steps and the working area should have safety rails to protect workers from falling. Accidents related to working at heights include falls, trips and being hit by objects. Falls from heights accounts for most industrial injuries and fatalities.

Besides workers falling from heights, there is the risk of the materials being processed at heights from falling and hurting those that are working at ground level. Lack of training regarding how to perform work at heights does not assist. Even if workers working at heights have proper safety protection, the workers would still not know how to perform their duties within the area, which is risky.

Such risky situations are sometimes made worse by supervisors who are not monitoring the workers performing duties at heights. A similar study by Wong, Chan, Yam, Wong, Tse, Yip and Cheung (2009) reported that lack of monitoring and supervision for workers working at heights was a major cause of falls from heights. It was further reported that lack of proper guidelines regarding safety training and how work is performed at heights contributed to the high percentage of accidents related to working at heights. Hoła, Hoła, and Szóstak (2017) reported the same results amongst workers using scaffolding in Lower Silesia, who further identified lack of protective barriers as a cause of falls from heights.

In other findings, Van der Molen and Frings-Dresen (2014) reported that most workers in the Netherlands tend to use their own PPE, which did not suit the conditions of the work environment. In addition, the workplace did not have safety measures in place. Amongst construction workers in Ethiopia, Tadesse and Israel (2016) identified poor supply of PPE by employers as accounting for major accidents.

4.3.5.9 Theme 4.3.5: An account of limited Health and Safety measures at the workplace by those in management

The provision of health and safety measures at the workplace was found to be limited in some industries. Those in authority, like management, were not doing enough to ensure that the workplace is safe and healthy for workers. It is the primary responsibility of those in authority like regulators, managers and supervisors, to ensure that there is compliance with health and safety in the workplace. Workplace supervision and inspection were not adequately offered, to ensure monitoring of the workplace and workers' conduct.

- Sub-theme 4.3.5.1: Existence of insufficient culture of safety supervision by supervisors

Supervision at most manufacturing industries was found to be lacking. In some cases, workers spent most of their time without a supervisor on site. A worker reported that there was an injury in their section and, at that time, the supervisor was not there.

The worker indicated the following:

> GW 9: The time the person got injured, the supervisor was not at the workshop

Supervisors were reported to be available at certain times of the day, for specific reasons and then leave the workplace as reported by the worker who said:

> GW 10: Yes, we just continue working alone because they are always… they might come to the workshop to look for something… job cards, when you are done working, job card to sign it off

Another worker reported similar experiences in their industry where supervisors were not available. The worker said:

> GW 13: The reason we have these accidents is because the supervisor is always busy in the office doing other things, some workers want to be told what to do otherwise they relax and do not wear PPE.

When one worker was asked about supervision, the worker reported that the supervisor is only available after they report accidents or production has stopped due to machines.

> GW: ..eh.. he always gives us orders when we start with our shifts and then lets us go and work. We call him if something happens like injury or the machine is giving us problems.

The purpose of supervision at work is to ensure that workers adhere to work procedures and that they comply with health and safety regulations. Supervisors monitor workers, educate them on how work should be done, and compile reports on any challenges that workers experience in their sections. By visiting work stations and observing the workers work, supervisors are able to understand the challenges that workers experience. Without supervision, workers' morale decreases leading to poor work ethics and less production for the industry. Workers feel neglected and used as objects of production; unlike for some supervisors who always participate, actively or passively, in their work.

In the Arabian Gulf region, it was found that non-availability of supervisors on-site or where work is done in one major cause of falls and being struck by an object. Due to lack of supervision, workers end up making wrong decisions, which cause accidents (Fass, Yousef, Liginlal & Vyas, 2017). Human error was reported as a contributory factor towards occupational accidents in the railway industry in Australia due to inadequate supervision. Supervisors were reported to be unable to follow their workers' work progress, leading to workers being negligent (Baysari, McIntosh & Wilson, 2008).

Findings by Lodgaard, Ingvaldsen and Aschehong (2016) indicated that lack of management and supervisor support was a barrier to continuous improvement in industries. Management tends to focus more on production and neglect their relationship with workers. Health and safety becomes a challenge and compromised when supervision is non-existent (Hansez & Chmiel, 2010). Information sharing was reported to be non-existent, which affected the morale of the workers.

- Sub-theme 4.3.5.2 Insufficient inspection by regulatory bodies reported

Part of the monitoring of workplaces is conducted by the Department of Labour inspectorate. Workers were asked if they often have such visits and they indicated that they do, but not frequently.

One worker said this regarding the Department's visits:

> GW 10: They, last year they did not come, we have only one from the Environment, inspectors from the Environment from Waste Disposal and from Air. We only got those but from the safety side, the injuries, the one who are dealing with injury thing, they came last of last year in 2014.

Some of the manufacturing industries use the services of both the Department of Labour and the Department of Mineral Resources (DMR) and they reported that only DMR does regular inspections. One worker reported that:

> GW 12: I don't know they hardly come unlike the department of DMR.

A worker questions the purpose of inspection because they do not do monitoring but wait for accidents to happen before they come:

> GW 13: They don't usually come often they only come when they, something click from their department that this company is hazardous, so many injuries are happening there let's go and see. But the environment usually they do their inspection as they, as they come, ya.

One workers indicated that the inspectors only come when they are on their way to do inspection somewhere else or they were just passing and decided to visit them.

> GW 9: Those ones, aah, you can see they were going somewhere and see that people are working there let us go and check. They don't even take time, they will talk to our boss and leave.

Instead of health and safety inspectors, one worker indicated that only Occupational Hygienists come, at the request of the industry.

> GW 11: We have hygienist that comes once a month if requested to come.

When asked if there are any visits by inspectors, the same worker said:

> GW 11: Inspectors come once a year here

The reported lack of inspection by the authorities in the manufacturing industries of Polokwane is a major concern because the purpose of inspection is to ensure compliance with regulations. Regular inspections reduce accidents and increase compliance to health and safety rules. Without inspection, industry management becomes complacent and fail to comply to safety rules. This ends up with workers who are either exploited or not applying safety measures at work.

Most reported occupational accidents are due to non-compliance with health and safety rules; the availability of inspectors could detect this at an early stage. There are instances where management is detached from production and leave workers to work on their own, which in most cases leads to unsafe acts by workers. Without inspections, industry management is unable to record and submit reports of accidents and incidents at work, which makes it impossible for those in authority to be acquainted with the situation in workplaces.

Health and safety regulations are passed to ensure that there is labour harmony and stability. The regulations ensure that the health and safety of those who are directly and indirectly affected by workplaces' activities are protected. The regulations are enforced by the labour inspectors. Lack of government supervision in industries by regular inspection of the workplaces results in an increase of occupational accidents.

In China, this lack of regular visits resulted in an increase in the development of industry workshops where a lot of workers were exposed to hazardous chemicals and occupational accidents (Zhang & Zheng, 2012). This was because work became unregulated and anyone could open a workshop and start operating.

Isik and Atasoylu (2017) reported that in Northern Cyprus, out of 92 industries that participated in their study, only one industry indicated that they had been visited by a labour inspector. In Nigeria, health and safety in the workplace has failed because of a lack of health and safety regulations and enforcement (Diugwu, Baba & Egila, 2012). The poor health and safety regulations resulted in most workplaces not complying with the health and safety laws of the country (Idoro, 2008).

- Sub-theme 4.3.5.3: Lack of organisational regulations and enforcement for the health and safety of workers

It has been determined that some manufacturing industries in the Polokwane municipality do not have rules and regulations on how health and safety should be implemented.

Due to the absence of such regulations, the industries are unable to enforce any regulations because of deviations from health and safety by workers. Such industries are more focused on production and dispatching of products. Workers were unable to explain their specific roles in the workplace, except to indicate that they work at that particular industry. Most of the workers perform multiple duties depending on the demand for products and the deadlines to produce such products.

A worker reported that it becomes difficult to focus on work if there are no clear instructions regarding how work should be done.

> GW 2: Look, here we try our best to work and satisfy the managers but sometimes we do not know whether we are right or wrong because we were never given papers how we should work. We are scared that we might cause the managers to be unhappy.

When asked what the Occupational Health and Safety Act says about how work should be done, one worker did not know what it was.

> GW 4: Maybe that one is for the bosses, nobody ever told us about that and how it works

When asked about whether action is taken against workers who act in an unsafe manner, a worker responded by saying:

> GW 7: There are no written rules to show that we will do this if you do this, as workers we are punished differently when we make mistakes here at work. Some workers are a danger to this area but sometimes they are not punished.

Another worker reported similar observations in her workplace where action is not taken against workers acting in an unsafe manner.

> GW 7: That worker was not supposed to be in that section when he caused the accident. When we move to another section we are given cards by the supervisor but he just moved and try to assist the other workers there. No action was taken against him up to now, maybe one, yah.

Without health and safety policies, an industry is unable to determine the type of knowledge and skills required. This, in most cases, leads to role ambiguity and occupational accidents. Such policies guide industries to identify hazards, plan training workshops, identify skills shortages, and help workers to understand their roles and responsibilities in the workplace. Through organisational regulations, management is able to act against any worker who deviates from health and safety activities.

Workers are expected to be responsible for their own health and safety and those of others who are exposed to their activities. Health and safety regulations offer guidance on how it should be done in the workplace. The reputation of an industry is based on how it handles health and safety. Without such programmes there is an increased likelihood of accidents because workers do not have guidelines on how to conduct themselves at work.

The unavailability of such regulations is in violation of OHSA (85 of 1993), which stipulates that each workplace should have a health and safety policy. In Tanzania, most workplaces lack organisational regulations that address health and safety issues, thus workers are harmed by the hazardous workplace without any assistance. The reported absence of health and safety laws has resulted in almost 2 million workers dying each year (Mrema, Ngowi & Mamuya, 2015).

It is further reported that amongst Iranian industries, management did not establish and implement organisational health and safety regulations because they found the implementation of health and safety regulations to be costly (Arastoo, Hakimovich & Esfandiarpour, 2015). Amponsah-Tawiah (2013) reported a lack of health and safety policies as a major shortcoming in the delivery of health and safety at work in Ghana.

- Sub-theme 4.3.5.4 Inadequate provision of health and safety in the psychosocial work environment

Inadequate work organisation in the psychosocial work environment reported in the manufacturing industries of Polokwane were those relating to work overload, involvement of workers in work activities, assisting workers with personal problems, and job insecurity. Workers indicated that they feel neglected by their employers, of whom they expected to receive assistance. Workers reported that at times they are expected to perform activities that they usually do not perform because the responsible individual had either not reported for duty or were busy with other activities.

Some workers with personal or family problems were expected to report for duty even though they had pressing personal issues to deal with at home. Some workers indicated that if they have financial problems, challenges at home or they are sick, they are still required to report for duty.

The majority of workers indicated that they are not involved with the development of health and safety policies or planning for other work related activities like maintenance or purchasing of equipment. They reported that they feel neglected and worthless and are only used as objects of production. One of the psycho-social challenges faced by workers is under-staffing, which leads to workers being overworked.

One worker reported the challenge like this:

> GW 2: We don't get time to do training like in-house training because of shortage of staff, workers had to continue being overworked without proper training

A worker indicated lack of health and safety assistance like training and first aid.

> GW 3: Uhm… There's a guy from… uhm…(noise from machine) Yoh, this place. There's a guy that comes and assists us with first aid and health and safety. We do that once in a year.

Regarding the involvement of workers in the development of health and safety programmes or other industry related matters, one worker indicated that they are not involved.

> GW 6: Our duty is to work, be paid, finished. What happens in the office is for the management and maybe supervisors. We also don't have policies here so, yah, that's that.

Another worker corroborated the issue of involvement and how it makes them feel:

> GW 7: … look we do not have a say in the company, if I get injured or somebody there is injured, we should come to work otherwise it is punishment for being absent. We need to protect our jobs and even if we report that other things are not there like equipment, they just promise to fix but they don't, what can we do?

One worker reported that there is no support for workers with social problems or any means to assist them:

> GW 5: No, I haven't heard him coming back from the disciplinary hearing saying that management was assisting me with the problem of… quitting alcohol, no

The psychosocial work environment involves the design of the workplace, how work is organised, the relationship between management and workers, clear job descriptions, and relevant tasks for workers according to their skills and knowledge.

Performing duties that workers are not trained for, because management and supervisors are pushing for production deadlines, increases the potential for accidents and harm to both the health of the workers and the industry. Inter-role conflict is a cause of many occupational accidents because different workers are expected to perform the same role but differently. Workers in the manufacturing industries of Polokwane use hazardous substances, and high-powered machines, and are exposed to different hazards that only trained and competent workers are supposed to execute.

The psychosocial work environment is one of the most challenging areas because most of the challenges faced by workers are not visible. It is only when workers have been strained for too long and cannot cope that others around them realise that there are problems.

The challenges around the psychosocial workplace are those that affect the nervous system. Pressure at work, home and from society are the source of such challenges and affected workers are unable to focus in the workplace.

Lack of provision of health and safety within that environment results in work pressure, lack of resources, role conflict, and management or supervisors who are too hard on workers and do not communicate properly with them. The manufacturing industries of Polokwane have workers who are experiencing psychosocial challenges and management is not attending to them.

Without management support, workers continue to work and some of them are working with dangerous machineries and hazardous substances, which requires concentration. Should a worker with such challenges continue to work, there is an increased likelihood of an accident occurring, which could affect those in close proximity or even the whole industry.

As indicated, the manufacturing industries of the Polokwane municipality utilise high-powered machinery, and chemical substances, and workers are exposed to hazards on a daily basis. It is expected that all workers should focus all the time. Workers who are depressed because they have family problems are unable to focus at work, while they are expected to operate high-powered and hazardous machines, use chemicals, or dispatch products for customers.

Most accidents at work happen because workers do not concentrate on the task at hand because of other issues occupying their thoughts. The major causes of occupational stress are a distant management, lack of resources, and lack of assistance with personal problems (Melia & Becerril, 2009). Workers expect those in management to offer comfort to them once they become aware that it is required. The WHO listed depression as the fifth most disabling disorder, with the likelihood of moving to second by the year 2020. Sometimes workers feel that a lack of recognition at work is a sign that the services they offer are not appreciated. To develop a positive mental aspect for workers, they should be involved in the development of workplace policies (Huang, Verma, Chang, Courtney, Lombardi, Brennan & Perry, 2012) and general planning of workplace developments.

Workers who receive support from management, supervisors and their colleagues are able to deal with the stressors that they are confronted with. Such support for workers can be in different forms like sympathy towards one's challenges and being offered an opportunity to express oneself (Sackey & Aminu, 2011).

Tella, Ayeni and Popoola (2007) identified job satisfaction as another source of stress is experienced by workers in the psychosocial work environment. Job demands like availability of resources, supportive work environments, time allocated for tasks, and availability of management or supervisors are still a challenge for workers (Emmerik, Bakker & Euwema, 2009) and when such demands are not met, this results in reduced commitment by workers (Tella, Ayeni & Popoola, 2007).

4.4 THEMES AND SUB-THEMES FOR MANAGERS/SUPERVISORS

Table 4.4 Themes and sub-themes from managers/supervisors

Themes	Sub-themes
4.4.1. Workers' conduct and ability to perform tasks are hazardous	4.4.1.1. Workers' negligent conduct resulting in injuries 4.4.1.2. Workers' ability to perform tasks identified 4.4.1.3. Lack of safety awareness and adherence to organisational regulations by workers 4.4.1.4. Lack of accident/incidents reporting identified

4.4.2. Lack of commitment by management towards Health and Safety at the workplace	4.4.2.1. There is lack of investment by management in the health and safety of staff 4.4.2.2. Poor work organisation leading to work overload of supervisors 4.4.2.3. Lack of psychosocial support by management to workers outlined 4.4.2.4. Lack of material resources for workers' personal safety reported

4.4.1 Theme 4.4.1: Workers' conduct and ability to perform certain tasks are hazardous

The findings from interviews with supervisors and managers indicated that the conduct of workers and their inability to perform certain tasks are a challenge to health and safety at the workplace. Injuries like amputations due to negligence, workers' inability to perform tasks, lack of safety awareness, and the inability to report accidents or incidents at work were reported to be challenges supervisors and managers face.

4.4.1.1 Sub-theme 4.4.1.1: Workers' negligent conduct resulting in injuries

The findings of this study revealed that the conduct of workers was not satisfactory and their behaviour at times caused injuries at work.

Some of the workers acted negligently, which unfortunately resulted in injuries as explained by a supervisor:

> S 1: Ehm, the amputations …. they were cutting firewood, that guy was cutting firewood during tea-time, taking some of the goods to make firewood that they pack inside their small bags. Then he, you see when you are, you are doing what you should not be, you are stealing, you sometimes try to look around and see, to see if somebody is looking at you or maybe one of the management or supervisor is coming.

Negligence was also reported in one manufacturing industry where a worker tried to operate a machine, disregarding the standard operating procedures, and injured his fingers.

The supervisor explained what happened on that day by saying:

> S 2: .. some of the machine are technologically eh, this automation machines, they use sensors, laser beams and the machine was broken at that time and the guy was trying to set the laser ‘cause he could not see the material, it was loose, so instead of doing lockout or stopping the machine completely the guy tried to test the laser while the machine is ON, then it sensed, it, it, he shift it off and it got activated and cut his two fingers.

In another incident it was reported that both workers did not follow the standard operating procedures, leading to one of them being hit on the head by a rock. The manager explained the cause of the accident by saying:

> M 1: When they left, DMR went to check where the stone fell; they found that the error was on the part of the injured person and the operator, who were there

Another form of worker negligence occurred when a worker was injured by mobile machinery because the person was not supposed to be sitting in an area where mobile machinery moves. The manager indicated this by saying:

> M 2: … but I am aware of the incident were a certain person had a serious fracture to their leg due to mobile equipment… it was… he was sitting in a certain area and people were moving the mobile equipment not aware that he is sitting there and they actually drove over his feet and his legs so he had a very serious fracture there

A supervisor reported a negligent worker who did not follow safety rules that he was trained to do, which resulted in an accident. The supervisor said:

> S 4: It means that the, he was doing maintenance while the machine was still in operation. And is, the guy has done training, professional training, he has done induction here

Negligence means performing work against the operating procedures, which results in either an accident or an incident. A negligent worker poses a threat to the health and safety of other workers, during work all workers are expected to perform their duties according to how they were trained.

Workplaces are demarcated according to the type of production that is conducted at each section and workers are expected to abide by the regulations as displayed on the notice boards in the workplace. There are instances where accidents at work are caused by nature; however, it becomes costlier to an industry if an accident is due to human error or an unsafe act. Workers are offered specific training in accordance with their skills and the type of products an industry produces, and it is expected of workers to adhere to the training and implementation.

The reporting by the managers and supervisors from the manufacturing industries of the Polokwane municipality, that the conduct of workers contributes towards occupational accidents experienced in their industries is consistent with those of Chen and Tian (2012) and Choudhry, Fang and Mohammed (2007). They reported that 88% of most reported industrial accidents were caused by human error, in particular unsafe behaviour by workers. Zin and Ismail (2012) further indicated that in some cases occupational accidents are caused by ignorant behaviour and bad attitudes of workers. Negative attitudes and bad conduct by workers was reported by Tappura, Nenonen and Kivistö-Rahmasto (2017) as a dominant factor that hinders commitment to health and safety regulations.

Workers were reported to display negative attitudes towards health and safety matters during safety meetings, which resulted in them being unable to implement safety procedures agreed on during health and safety meetings (Tappura, Nenonen & Kivistö-Rahmasto, 2017).

4.4.1.2 Sub-theme 4.4.1.2 Workers' ability to perform tasks identified

Managers and supervisors reported that the ability of workers to perform certain tasks in the manufacturing industries of Polokwane was not sufficient. Most workers had the experience and knowledge to perform allocated tasks, but they are unable to perform as expected. In some instances, it takes workers a day to complete certain tasks that could be completed within a specified time.

A supervisor who observed workers who are unable to perform certain tasks, indicated that by saying:

> S 1: Here we are seating with a huge problem, most workers here do have skills to operate certain machines, others we train but it takes time for them to understand what we want or how to work in this environment.

Another supervisor explained the situation in their industry:

> S 4: we do have those workers who lack the ability to perform certain tasks, although they are not in the majority but if they cause an accident it affects all of us. We train them when there is time but it is a concern that we have such workers. Our industry has a lot of risks and they could hurt themselves or others.

Work pressure is also reported as the cause of workers being unable to perform certain tasks due to lack of knowledge:

> M 3: In our industry production comes first, just yesterday we had a request from one of our branches to assist with products so we need manpower. We hire this guy with the hope of training them but at times pressure is too much. You find that you no longer have time to train that person, you just say 'let me show him how it is done and he will understand',

A manager indicated that some workers reported that the type of work they are supposed to perform was too much for them:

> M 2: Most of our workforce are working in that sorting area and some of them requested us to move them to other sections because they cannot cope.

The challenges that managers and supervisors in the manufacturing industries of Polokwane experience regarding the inability of their workers is a threat to health and safety. Management that does not invest in the development of their workforce should expect workers who underperform.

This leads to a workforce that performs tasks in an unsafe way. Management should also ensure that job descriptions are linked to the ability of workers, to avoid a trial-and-error type of workplace where workers learn as they go.

Boström, Holmgren, Sluiter, Hagberg & Grimby-Ekman (2016) indicated factors such as the physical work environment, the type of work workers executes, and the type of management in an industry as barriers for workers to perform their duties. The ability of workers to perform tasks is usually hampered by management's way of doing things in the workplace. Another finding that affected the ability of workers to perform was the scheduling of tasks during the day.

For workers to perform as expected, it depends on the time of the day the task is supposed to be performed (Boström, Holmgren, Sluiter, Hagberg & Grimby-Ekman, 2016).

The findings by Gould, Ilmarinen, Järvisalo and Koskinen (2008) also indicated that work that is too physical depresses workers, who are then unable to perform such task. A demanding job, coupled with poor work conditions, has the potential to lead to workers being unable to perform their tasks (Fassi, Bocquet, Majery, Lair, Couffignal & Mairiaux, 2013).

Management's lack of investment at work was the reason workers were unable to perform tasks among health workers. Resources at work, like training and health and safety policies and the type of management, enable workers to learn, gain knowledge and be able to execute tasks in a satisfactory manner (Converso, Sottimano, Guidetti, Loera, Cortini & Viotti, 2017). Without such resources and management intervention, the ability of workers to perform their tasks is affected (Ilmarinen, Ilmarinen, Huuhtanen, Louhevaara & Näsman, 2015)

4.4.1.3 Sub-theme 4.4.1.3 Lack of safety awareness and adherence to organisational regulations by workers

Managers and supervisors also reported what the workers had reported with regards to the lack of safety awareness and adherence to organisational regulations. Workers in the manufacturing industries of Polokwane are reported to act in an unsafe manner, which threatens the health and safety of those in the industry and others who are indirectly affected by their activities like visitors, customers and the surrounding communities. Some workers were reported to be working without protective equipment, some bypass safety rules, and others are ignorant of the consequence of their actions.

A supervisor explained some of the non-adherences by workers in their industry:

> S 3: Sometimes these workers do not put on PPE and they know very well that it is a law here. PPE is meant to protect workers against injuries, we train them and we tell them every day before they start work. They will tell you that 'I just wanted to finish this quickly I will wear it'.

The conduct of a worker, unaware of the dangers of incorrectly using a rotating machine, was reported by a concerned supervisor:

> M 3: I will just walk in there during operations and you find a worker trying to use his hand on a big rotating machine, you ask him what are you doing, he just look at you and say I was removing that wood because it is blocking the way. You ask yourself whether it's ignorance or what. That machine can chop a hand within a second.

A manager explains the cause of a near-miss caused by a worker who works in a different section:

> M 2: the person who was operating the machine was not supposed to be there in the first place. Maybe he saw other workers using the machine and thought he could operate it. Fortunately, nobody was hurt but next time he might not be lucky.

A supervisor explained lack of awareness that led to an accident by saying:

> S 7: When we investigated the cause of fire, we realised that one worker just filled the whole tank with paraffin even though there are levels that guide how much you must use. That is why the machine caught fire because it was over-flowing.

The challenges that managers and supervisors face regarding the conduct of workers is a concern. Workers who are trained to perform duties and act in an unsafe way could cost the industry a lot. Adherence to safety procedures is part of how workers should apply themselves at work and failure to so results in accidents. Supervisors reported workers who also did not wear PPE while working which violates safety regulations. ILO (2006) reported that the statistics of occupational injuries keeps rising but workers still do not adhere to safety regulations. Cost due to accidents impacts negatively on customers who do not want to associate with accident-prone industries. Companies are also fined a lot of money for any accidents.

Safety awareness amongst workers is a challenge in most industries. Unsafe acts by workers' accounts for most industrial accidents resulting in injuries and fatalities (Zou & Sunindijo, 2013). In most cases workers display lack of awareness by operating machinery without following the correct procedures (Bagagiolo, et al., 2017). Machine operators are amongst those who cause the most accidents in industries by displaying incorrect behaviour during operations and working without PPE (Narasimhan, Crowe, Peng, Hagel, Dosman & Pickett, 2011).

Non-adherence to health and safety regulations and dangerous work are other factors causing hand injuries, being caught between machines, and fatalities. Workers are used to continuing working whilst the machines are running without first switching them off (Lind & Nenonen, 2008). Lind (2008) further reported dangerous risk-taking methods of performing work as causes of fatalities in the manufacturing industries of Finland. Other factors that indicate lack of awareness towards health and safety and compromising safety of workers are non-compliance to safety procedures (Tebeaux, 2010).

In South Africa, the OHS Act (85 of 1993) indicates that the employer should provide a workplace that does not pose any harm to workers and workers are responsible for their own health at work. In Ghana, the authorities tried to implement health and safety procedures based on international standards but non-adherence by workers still remains a challenge (Acakpovi & Dzamikumah, 2010).

4.4.1.4 Sub-theme 4.4.1.4 Lack of accident/incidents reporting identified

Accidents occur in the workplace but workers from the manufacturing industries of Polokwane were reported to be scared to report them. It is reported that workers who are involved in accidents or incidents do not report them to their supervisors or managers. This, according to their supervisors and managers, is due to the fear of being blamed and punished by management. Other workers regard certain accidents or incidents as minor and therefore do not see a need to report them. Examples of such accidents and incidents that happened are chemical spills, broken window glass, falling objects from stacks, falling bricks that were packed and falling rocks that were offloaded. Workers hide incidents because they fear losing their jobs. A chemical spillage was not reported and was discovered by the supervisor at a later stage. The supervisor said:

> S 9: You see you cannot be everywhere all the time, there was time where chemicals spilled and our workers quickly cleaned the area and did not inform us. Chemicals are chemicals you could smell something even after a day or so, even the floor will change colour so that is how we got to know what happened.

Goods that were improperly stacked fell during the night whilst there was nobody at work and nobody reported it:

> S 6: Nobody reported the accident, they just did damage control by fixing the shelves and packed the goods again. There is a possibility that the shelve might fall again

One industry suffered losses after sheets of glass were damaged as they were offloaded from the truck and it was not reported to management:

> S 5: The driver and workers decided not to tell us what happened because the delivery was done after working hours. We were not aware that the stock was not delivered until after a month when we were doing auditing. By that time, we could not claim from insurance and we also do not know if there were injuries or not.

A manager explained that a worker got injured but all involved decided to cover it up:

> M 3: There was an accident where a crane was transporting pipes from one section to the other, one worker was hit as the crane was offloading but nobody reported to us. We hear the worker went to the hospital but he tells us it was for an injury he suffered at home.

The purpose of reporting accidents or incidents in the workplace is to assist management to identify failures within the work environment that could cause harm to workers and those exposed. Most accidents can be prevented if the hazards are identified early, but failure to report near-misses prevents such early detection.

In most industries the cause of this failure to report near-misses is due to the way management interacts with its workers, which builds mistrust between workers. Workers indicating that they fear victimisation if they report some accidents indicates that workers do not trust each other. Mistrust between workers and management is caused by a lack of communication and not involving workers in matters relating to health and safety. Workers who fear victimisation is due to a distant management who is not involved with the daily activities of an industry, which leads to workers not reporting accidents or incidents.

Within the shipping industry of Finland, maritime personnel reported that there was no reason to report accidents because it was a waste of time. They reported that every time accidents or incidents are reported there is no action taken by those in management to resolve the causes (Kunnaala-Hyrkki, Lappalainen & Viertola, 2018). Mahajan (2010) further indicated that, apart from not seeing the significance of reporting, clinicians in one industry indicated that they do not understand how the report will be analysed and how the results will benefit the workplace.

Fear of discipline and lack of feedback were reported to be the main reasons why workers do not report accidents and incidents observed at work. Management tends to blame workers instead of focusing on how to avoid such accidents in future (AbuAlRub, Al-Akour & Alatari, 2015). Blake (2007) also found that lack of feedback was a barrier towards incident reporting. Other than lack of feedback, Köhler (2010) reported that another barrier to reporting accidents was fear of the report being made public, leading to victimisation of workers.

Makri and Neely (2017) found that lack of work experience was a barrier to reporting workplace accidents amongst some workers in Servitized Manufacturers. Some of the workers reported fearing the consequences because some were victimised by management, while others reported the non-existence of a culture of reporting in their organisation. Some workers reported that they could fix the damage themselves and saw no need for involving management.

Caraballo-Arias (2015) indicated that in Venezuela, workers were reporting accidents but they were under-reporting and hiding certain information from management. The practise of under-reporting accidents affects the calculations of statistics and impacts negatively on investigative measures against health and safety accidents in the country (Caraballo-Arias, 2015).

4.4.2 Theme 4.4.2: Lack of commitment by management towards health and safety in the workplace

Management of the manufacturing industries of the Polokwane municipality, was reported by supervisors to show a lack of commitment towards health and safety. Supervisors indicated that at times they report certain health and safety related issues to management but they are not assisted. The supervisors expressed frustration because failure to fix or purchase what they requested could result in accidents, and they are the people responsible for health and safety in the workplace.

4.4.2.1 Sub-theme 4.4.2.1: There is lack of investment by management in the health and safety of staff

Supervisors reported that, in the manufacturing industries of the Polokwane municipality, they were not receiving enough support from management regarding the availability of resources. Resources such as staffing, machinery, tools, training, and engagement with workers were lacking, and where they were available they were not adequate. Management tended to depend a lot on supervisors to monitor production rather than supply the means to production.

A supervisor related his frustration regarding staffing and training of workers:

> S 5: I was in the production I know, we use, sometimes we take risks. You say ‘can I use him for now? and I will stay there for some few minutes and he continue doing it right, then I move. Immediately when you move an accident happen because that guy is not sure of some of the other stuffs**.**

One supervisor explained how it is difficult to continue with production if workers are not trained and there is shortage of staff:

> S 8: And the problem, the other problem is that we don't have, we don't get time to do training like in-house training because of shortage of staff. Sometimes when I say I want 10 guys, I need maybe 5 from a certain department and 5 from another department then who is going to replace them?

Shortage of equipment was reported as a challenge where some workers had to improvise and use old machinery. A supervisor explained:

> S 6: that machine is old and slow and here we must work, customers outside are waiting for stock. I tried several times to talk to management about it and they keep promising. That machine is a danger to all of us.

Workers are not involved in how safety issues are planned and it poses a problem to the supervisor:

> S 7: When you tell workers to work in a certain way, they ask some questions because some of the things are impossible. The workers know what is wanted and what is not wanted where they work but it seems like these things are just pushed to them. If maybe we have a meeting, all of us, with management, at least they will hear what is wanted.

A supervisor related how difficult it is to be provided with resources when he requires them.

> S 2: …the problem is I have to, eh, to dig to get something from them in terms of safety

Workers who work under conditions that indicate a lack of interest in their health and safety matters become demotivated and erratic at work. Some of them become resilient because they offer more and management does not assist them in achieving production goals through investment. An injury to one worker affects an industry in terms of lost working time, demerit points by monitoring authorities, and a bad reflection to customers.

Although some of the factors indicating lack of investment were discussed separately in this chapter, it is important to note that management's lack of investment affects workers and they should be highlighted in order for those in authority to note that investment in an industry is not only in making available machinery and building structures, but includes psychosocial factors.

Low investment by management towards health and safety in the workplace was identified by Zhang and Zheng (2012) as a contributing factor towards chemical accidents in China. It is the role of management to monitor and have knowledge about what they expect from workers. This is a way for workers to understand what is expected of them and it shows that management is not distant from them (Braithwaite, Wears & Hollnagel, 2017; De Carvallo, Righi, Huber, Lemos, Jatoba & Gomes, 2018).

Guldenmund (2010) highlighted the importance of investment in industry health and safety by indicating that the culture management instils influences workers to conduct themselves in an acceptable way. Safety knowledge and motivation play an important role in the safety behaviour of workers (Vinodkumar & Bhasi, 2010). This type of investment by management, coupled with the availability of health and safety policies, supervisor support, and making resources available, encourages workers to feel accepted and be able to perform their duties safely (Liu, Huang, Huang, Xiao & Chew, 2015).

Biggs, Banks, Davey and Freeman (2013) are of the view that the commitment of management in the form of investing in the health and safety of workers is key to a positive culture in industries.

Investment in health and safety activities contributes towards the positive attitudes of workers to their own safety and that of their co-workers. Without management investment through commitment, the management of the health and safety in most workplaces becomes dysfunctional. Commitment through engagement with workers and involving them in some decision-making results in a positive attitude (Nordlöf, Wiitavaara, Winbland, Wijk & Westerling, 2015).

4.4.2.2 Sub-theme 4.4.2.2: Poor work organisation leading to work overload to supervisors

Work organisation includes the relationship between management and its workers, the recognition that management offers to workers, the workload, and the quality of the physical work environment. Supervisors in the manufacturing industries of Polokwane indicated their displeasure regarding the way work is organised in their industries. Most of the supervisors reported not receiving positive feedback from their employers regarding the resources that they request. It was reported that management takes time to respond to their requests, and when they do respond, not all requested resources are made available.

Most of the supervisors are overloaded with work, as it is expected of them to monitor workers, do office work, and manage production processes. Supervisors reported that it is difficult to multi-task in a work environment that has hazards. Some of the supervisors indicated concerns regarding the condition of the physical environment, like hazards related to working at heights and working in congested areas.

A supervisor reported how frustrating it is to convince workers to work when there are challenges they face:

> S 4: Sometimes you will ask yourself whether management has the interest of workers at heart. I have identified some challenges that should be solved but they have done nothing so far. You could even see how this area is organised … somebody might be injured.

A supervisor explained that working at heights is hazardous and management does not show signs of improving safety within that area:

> S 5: The reason a worker got injured after falling was that we do not have barriers up there, workers work in an open space. If you work at heights, you need to provide workers with safety measures. These workers are trained to work at heights but without barriers it remains risky to work there.

The distance between management, supervisors and workers was reported to be a challenge in the industry as reported by one supervisor:

> S 2: Here management is there and we are here and work must continue. Management meetings are usually held at head office and we do not know what was discussed. We don't usually get feedback from our management.

A supervisor relates how difficult it is to perform multiple tasks, which sometimes leads to psychological challenges:

> S 5: This thing of doing office work, train workers, supervise and write reports is straining me. Sometimes I do some walk-around to do risk assessment and then go back to office.

It is the duty of supervisors to monitor the workers while executing their duties to ensure that workers adhere to standard operating procedures. Without supervision, workers tend to be negligent and cause accidents at work. Supervisors should therefore be at different work stations to offer assistance and monitor if workers are conducting themselves according to operational regulations.

Feedback from management serves as a motivating factor, as it indicates to supervisors that management is committed to the development of the industry. Without feedback, supervisors are unable to track their performance and the progress of the industry. This is more complicated for those supervisors whose physical work environment was reported to be hazardous. Feedback in such instances ensures that any hazards that are identified are taken care of to avoid accidents.

The findings by MacDermid, Geldart, Williams, Westmorland, Lin and Shannon (2008) revealed that a healthy and safe workplace can be created if workers are involved in the affairs of an organisation. Schreurs, De Cuyper, Van Emmerik, Notelaers and De Witte (2011) reported that workload and lack of resources were factors leading to workers taking early retirement.

Porto & Marziale (2016) reported that the type of work organisation and being overloaded with work were reasons why some workers fail to comply to safety standards. When the demands at work, like performing multiple tasks, increases, the is an increased likelihood of workers being worn-out physically and mentally. Lin, Williams, Shannon and Wilkins (2007) found from Chinese workers, that concerns related to how the workplace is organised, affects their health at work. Identified organisational concerns reported were employers' commitment, communication, and being recognised at work. A worker who is involved in the affairs of an organisation has the potential to increase task performance (Schaufeli, Bakker & Van Rhenen, 2009).

4.4.2.3 Sub-theme 4.4.2.3: Lack of psychosocial support by management to workers outlined

Supervisors reported that they observed a lack of psychosocial support by management to workers in the manufacturing industries of Polokwane. Issues identified that have an effect on the mental abilities of workers included hazardous work environments, distant management, and lack of material resources. Workers who are dissatisfied are unable to perform their duties and lose concentration easily at work.

Most manufacturing industries in the Polokwane municipality have hazardous work environments, which requires workers who are fully focused the whole shift. Management should have an open-door policy for workers, and should purchase and maintain equipment to ensure that workers are satisfied and productive. It is therefore the duty of management to provide workers with a work environment that does not pose harm to the health and safety of workers.

A supervisor indicated a distant management who did not offer support to workers:

> S 2: Management has shifted all responsibilities to me and at times when I request resources from them they do not deliver. Sometimes it takes me a week without seeing them here at the plant

When asked about the role that workers play in the development of health and safety policies, the supervisor said:

> S 5: They are not involved in any way; their job is at the plant the rest management does.

Regarding social support to workers from management, a supervisor responded by saying:

> S 4: Here we never heard of management engaging workers regarding their life in general. That culture has never been there and does not seem like it will start.

Another supervisor indicated a lack of social support in their industry by saying:

> S 2: Yah, workers are offered leave days and once they are done no worker should be absent without a serious reason

Availability of resources is a challenge in most industries and affects the morale of workers, as one supervisor explained:

> S 1: Machinery, tools, availability of PPE … and correct PPE …hmmm.. guardrails up there are some of the challenges we face. Sometimes you just feel for these workers but what can we say, it's job.

Supervisors in the manufacturing industries of Polokwane find it difficult to motivate workers who are distressed due to the working conditions. Management that is too distant from its workers indicates to workers that they do not have their best interests at heart. The distance between management and workers makes it difficult for supervisors to convey certain instructions to workers who are less motivated. Workers in the manufacturing industries of Polokwane work under hazardous conditions and they require equipment that is not faulty, elimination or control of identified hazards, and the offer of training that will enable them to perform tasks in a knowledgeable way.

A depressed worker is a hazard because that worker is expected to work in a hazardous area and still perform duties in a safe manner, which is impossible. Once a worker is depressed, they lose focus and concentration, leave work early due to exhaustion, and some take early retirement, while others continue to work but in an unsafe manner.

Most workers fear management to such an extent that they do not report accidents because they fear being blamed. This affects the control of hazards in the workplace because management does not know which hazards to eliminate, substitute or control. Workers require assistance through the provision of resources in the psychosocial work environment. Psychosocial support at work involves management's ability to assist workers with resources that may ensure that workers are not physically and psychologically strained. In a workplace where psychosocial miseries amongst workers are high, workplace failures increase and lead to occupational accidents (Hilton & Whiteford, 2010).

Causes of psychological miseries include lack of organisational and management support and the type of safety climate in an industry. If these are not properly managed, the quality of work and the health of workers becomes compromised (Hossain & Aktar, 2012). Management support is the first resource that should be offered to workers and if done, will increase positive work outcomes and boosts workers' wellbeing (Demerouti, Le Blanc, Bakker, Schaufeli & Hox, 2009). Lack of support, including lack of provision of resources like training, health and safety policies, family support and equipment, causes job dissatisfaction (Bakker & Demerouti, 2008).

Excluding workers in the affairs of an industry or organisation affects their morale and management should engage workers on how their workplace operates (Bakker & Demerouti, 2008). Engagement improves work relations, motivates workers and increases production, and workers' safety awareness (MacLeod & Clarke, 2009; Truss, Shantz Soane, Alfes & Delbridge, 2013). Without engagement workers become psychologically drained and physically incompetent (Zakerian & Subramaniam, 2011).

4.4.2.4 Sub-theme 4.4.2.4 Lack of resources for workers' personal safety reported

Lack of material resources was reported by supervisors to be a challenge they face when trying to ensure that workers are not at risk while working. The biggest challenge reported by supervisors was the availability of PPE for workers. Supervisors indicated that, in most cases, they report to management that workers are in need of PPE but it takes time for it to be made available. This forces workers to improvise because production needs to continue, at the expense of safety.

Another challenge reported by the supervisors was ageing and faulty equipment that is unpredictable for workers regarding when it could stop functioning or cause an accident. Supervisors also reported the unavailability of health and safety policies as a major concern.

A concerned supervisor explained lack of support from management by saying:

> S 5: It is really frustrating to me because I have requested for PPE from management and they indicated budget constrains. Workers are using old PPE as you can see some of them

Faulty equipment at most manufacturing industries was reported as a hazard by a supervisor:

> S 1: I can say old machines that are not maintained properly is the main challenge and hazard here. These machines sometimes are faulty and stop working or they become slow. The problem is they make a lot of noise if they take time without being serviced.

At times supervisors encourage worker to improvise because there is limited resources at work. A supervisor explained this by saying:

> S 2: Workers use old equipment but we managed to explained to them that they should be careful when using them. If they are careful then there is no danger but you know workers could sometimes break the law.

Lack of resources like health and safety policies was reported as a challenge for towards applying safety rules:

> S 4: The other thing is that we do not have health and safety programmes, like policies. It is difficult if there is nothing that guides you how to work safely. There is also no OHSA displayed to warn workers about the law.

Some hazardous areas were reported to lack protective equipment:

> S 1: we are short of resources like PPE and the area where workers are at heights do not have guardrails in case a worker slips. Health and safety is a challenge especially when Labour does not audit us.

As reported in this chapter, supervisors reported not receiving enough support from management. Lack of material resources impacts negatively on the establishment of a healthy and safe work environment. Workers depend on supervisors for the supply of resources and supervisors depend on management. Although PPE is always regarded as the last resort at work, there are instances where it should be used.

Lack of PPE provision leads to workers either using incorrect PPE or not using it at all, as previously indicated. Most workers resort to using any protective equipment available, thus exposing them to hazards that could have been avoided had they been provided with the correct equipment.

Supervisors face the daunting challenge of trying to convince workers to adhere to health and safety rules when performing their duties if workers are expected to use faulty or ageing equipment. Faulty or ageing equipment is a potential disaster, which could have devastating consequences on any industry.

Health and safety policies guide management and workers on how health and safety will be implemented. Implementation includes availability of resources and management commitment to ensure that the policy is successfully implemented. Without such a policy, it is difficult to have a successful health and safety programme in the workplace

In most cases, management expects workers to improvise with the hope that production will be maximised, while in the process ignoring the outcome. Most workers were reported to have been involved in occupational accidents because they were compelled to perform dangerous tasks. Workers did not have the resources to protect them against harm emanating from the workplace (Amorim & Pereira, 2015).

In Ghana, lack of health and safety policies hampered the provision of a comprehensive health and safety programme (Amponsah-Tawiah & Mensah, 2016). This is the reason most workplaces in that country do not have their own facilities but depend on government and community facilities.

Safety resources like health and safety policies serve to reinforce a healthy and safe workplace (Chinda, 2014). Workplace health and safety policies and the way safety is practised indicate how management values health and safety. Positive leadership in an industry has the likelihood of developing a safer work environment (Andel, Hutchinson & Spector, 2015). Other resources like faulty machinery (Jacinto, Canoa & Soares, 2009), insufficient supply of PPE (Lombardi, Verma, Brennan & Perry, 2009; Wagner, Kim & Gordon, 2013) and incorrect supply of PPE (Cheng & Wu, 2013; Aliyu & Saidu, 2011) indicate lack of resource provision by management, which compromises workers' safety in the workplace.

It was found out from the three data collection methods that most manufacturing industries in the Polokwane municipality do not have training programmes, workers were negligent as they were performing their duties, lack of management support and PPE use by workers was insufficient.

Figure 4.3 Simplified guide for the prevention of occupational accidents in the manufacturing industries of Polokwane municipality.

4.5 CONCLUSION

The study findings reflect that there are challenges faced by management, workers and their supervisors in the manufacturing industries of the Polokwane municipality. A fragmented work environment, lack of support for supervisors, the general working conditions, and workers' inability to follow standard operating procedures contributed towards most occupational accidents within all industries that participated in the study.

CHAPTER 5

THEORETICAL FRAMEWORK

5.1 INTRODUCTION

This Chapter presents the Theoretical Framework that guided the development of a training programme, which was the main aim of this study. A theoretical framework explains, predicts and challenges existing knowledge. It embraces a theory of a research study and defines reasons for the existence of the problem in research (Sitwala, 2014). The current study applied the WHO Workplace Framework and Model as a guide for the development of a training programme which could empower workers with knowledge and skills on how a healthy and safe workplace should be designed. The WHO Workplace Framework and Model is discussed according to its different sections and how the sections link with the identified conditions in the manufacturing industries of the Polokwane municipality as they emerged from the findings of this study. It is further indicated how each section could be applied to ensure a healthy and safe work environment in the manufacturing industries of the Polokwane municipality.

5.2 OVERVIEW OF WHO WORKPLACE FRAMEWORK AND MODEL

For this study, the WHO Workplace Framework and Model by Burton (2010) was adopted because it describes how a healthy and safe workplace should be developed. The WHO Workplace Framework and Model was developed based on numerous health and safety meetings worldwide where scientific evidence was gathered and presented during the various Health Promotion and Occupational Health meetings.

The purpose of the WHO Workplace Framework and Model is to create a working environment for workers, their families, communities and the environment that takes care of health and safety of all stakeholders mentioned. For a workplace to have a healthy and safe working environment, both the employer and workers should work together.

The WHO Workplace Framework and Model is a comprehensive model that is arranged in three parts: avenues of influence for a healthy workplace, process for implementing a healthy workplace programme, and the core principles. Each of the three parts is further sub-divided into areas that explain how a successful workplace programme could be developed and points out that all the areas are interrelated. The development and implementation of each area are discussed accordingly in relation to the training programme that was developed in this study.

The contents of the health and safety training programme are based on the findings of the study after interviews with managers, supervisors and workers. The WHO Workplace Framework and Model guided the development of the training programme regarding how vital the involvement of both workers and management is. The training programme, guided by the model, indicates how a working relationship between workers and management can assist in achieving the desired goals in the workplace. Both workers and management in the manufacturing industries of the Polokwane municipality can further use the WHO Workplace Framework and Model to implement more strategies that are linked to health and safety.

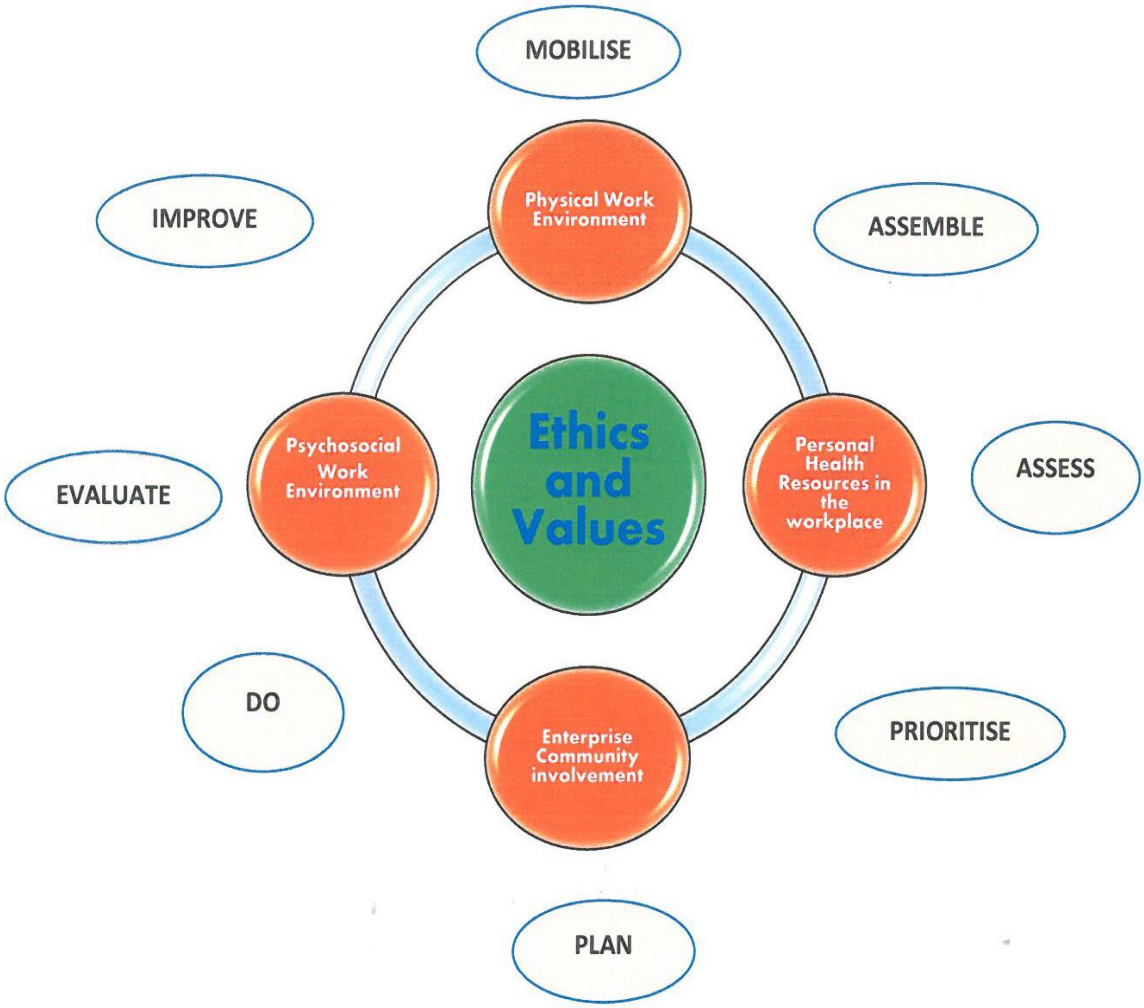


Figure 5.1 The WHO Workplace Framework and Model (WHO, 2010)

5.2.1 Avenues of Influence for a Healthy Workplace

The Avenues of Influence for a Healthy Workplace is divided into four areas; the physical work environment, psychosocial work environment, personal health resources in the workplace, and enterprise community involvement.

The developed health and safety training programme for the manufacturing industries of the Polokwane municipality has taken all these aspects into consideration. The training programme indicated the physical work environment, which is covered by health and safety regulations, hazards posed by machinery and chemicals, and the provision and use of PPE. For personal health resources and the psychosocial work environment, the

training programme focused on training of workers as a way of supportive behaviour by management to ensure that the health well-being of workers is safeguarded. Those workers who work at heights and in congested areas have to be taken care of and they should not feel neglected. For community participation, workers themselves will be trained on how to investigate accidents and incidents and to identify hazards as a way of health and safety education. The four parts overlap each other and cannot be applied individually.

The application of the four avenues depends on the industry, where some may apply to certain industries due to its needs and some may not apply to other industries. The manner in which industries implement some or all of the avenues is discussed later in this chapter.

5.2.1.1 The physical work environment

The physical work environment is a section of the workplace that has the potential to cause harm to the health of the workers physically and mentally, as well as to their well-being. The physical work environment consists of all hazards in the workplace, either indoors or outdoors. The categories of hazards that are mostly found within the workplace area are biological, chemical, physical, psychosocial, ergonomic and mechanical hazards (WHO, 2010).

Through the use of interviews of the managers, supervisors and workers and observation, it was found that the physical work environment in the manufacturing industries of Polokwane had mechanical and chemical hazards, negligence, and inappropriate and improper use of PPE. These hazards have the potential to cause harm to workers if they are not eliminated, minimised or replaced.

The WHO Workplace Framework and Model guides that health and safety concerns within the physical work environment should be addressed as soon as they are detected. It is from the WHO Workplace Framework and Model that the training programme was developed, where workers have to understand what a hazard is and what the associated risks are to identified hazards. To ensure that health and safety is maintained according

to the WHO Workplace Framework and Model, the training programme has modular units that teaches workers about how they should conduct themselves and prevent negligence.

The model further guides that hazards should be identified, assessed and controlled. It is through these guidelines that hazard identification, risk assessment and control are included in the modular units of the training programme. Prevention methods, according to the model, should be applied by instituting controls at the source of exposure. Proper PPE that is of the correct size and that is relevant to the identified hazards should always be provided. This was an identified challenge amongst workers in the manufacturing industries of the Polokwane municipality where workers were either provided with improper PPE that was not relevant to the type of work done by the workers or it took time for PPE to be replaced when it was worn out. The training programme included a unit on the provision of relevant PPE and correct use by workers.

5.2.1.2 Psychosocial work environment and personal health resources

The psychosocial work environment is defined by WHO (2010) as the organisation of work, organisational culture, system beliefs, attitudes, practices and channels of communication. All these attributes, when combined, shape the behaviour within an industry and such behaviour can affect the physical and mental health of workers positively or negatively.

Personal health resources address similar aspects to those of the psychosocial, as it focusses on a supportive work environment, information sharing and availability of health resources. These two avenues describe challenges posed by non-physical hazards that lead to stress and depression, due to poor work organisation and poor communication. Workers in the manufacturing industries of Polokwane reported distant management, and lack of resources and training. These are some of the challenges WHO identified as potential causes of stress and depression and should be dealt with.

The units in the training programme that focus on both psychosocial and personal health resources were advised by the challenges that were identified in the manufacturing industries of the Polokwane municipality. The training programmes offer workers an opportunity to learn how to investigate accidents and incidents and later how to write

reports. Another modular unit covers a section on management roles in an industry and organisational culture to ensure that management understands their role and that of the workers in an industry. A better way of dealing with non-physical hazards can be the involvement of management in identifying those non-physical hazards and eliminating or minimising sources of stress in the workplace. Identified stressors can be dealt with by offering workers training and a feeling of programme ownership, and a sense of belonging, that they are accepted within the workplace. These are attributes that define workers and their work (Burton, 2010; Vischer, 2007).

5.2.1.3 Enterprise community involvement

Enterprise Community Involvement is the role that an industry plays in ensuring that there is a healthy and safe surrounding where that industry operates. This should be done through health and safety programmes that should prevent exposures, like pollution spilling into the surrounding communities. Most manufacturing industries in the Polokwane municipality engage in activities that could pollute the environment of the surrounding communities and it is important that worker are trained on how to control the activities in their workplaces (WHO, 2010). The training programme included units that cover the categories of hazards, their route of exposure and impact if they are incorrectly disposed of. The modular units also cover accident and incident investigation and reporting that could be used as feedback to those affected.

5.2.2 Process of continual improvement and co-principles for a healthy workplace

According to the WHO Workplace Framework and Model a plan to transfer knowledge gained through the four avenues into action needs to follow a certain process that aims to implement, review and apply changes in the programme. The continuous improvement process that was developed by WHO (2010) describes the role that management and key stakeholders should play in an industry. This process strives for a holistic and multi-disciplinary engagement towards the improvement of an industry, whilst focusing on health and safety issues.

This was found to be lacking in the manufacturing industries of Polokwane, where management was detached from the production activities and did not involve other stakeholders like workers in the planning activities of the industry.

The WHO Workplace Framework and Model further guides that leadership engagement is vital to the improvement of an industry and adherence to health and safety issues. Engagement is the inclusion of relevant stakeholders in the industry with the purpose of integrating goals and values of the industry into health and safety. Management commitment is vital through opening communication channels to everybody in the industry. Since it was found that management in most manufacturing industries of the Polokwane municipality is detached, the training programme includes a modular unit on management issues like roles and building spirited teams amongst workers to forge cooperation in the industry. Workers involvement in planning and the development of health and safety policies should be prioritised in the industries.

The workplace situation in most manufacturing industries of Polokwane municipality was different to what the WHO Workplace Framework and Model guides. Management in most industries was detached from production activities, where workers are at the bottom of the chain.

5.3 CONCLUSION

Using the WHO Workplace Framework and Model, the current study was able to identify strategies that the manufacturing industries of Polokwane could implement in order to prevent or minimise occupational accidents. Risk assessment within the physical work environment was found to be a challenges. Similar challenges found include those related to the psychosocial and personal health resources and the involvement of stakeholders in developing health and safety policies.

CHAPTER 6

DEVELOPMENT OF TRAINING PROGRAMME FOR MANUFACTURING INDUSTRIES OF POLOKWANE MUNICIPALITY AND ITS VALIDATION

6.1 INTRODUCTION

The objective of the study was to develop and validate a training programme that could assist manufacturing industries in the Polokwane municipality to prevent occupational accidents. This phase focused on the development of the training programme based on the findings of the study. The development and utilisation of a health and safety programme in the workplace boosts the confidence and compliance of workers.

The training programme is meant for all workers in any industry irrespective of trade or size. The purpose is to ensure that workers and managers are able to prevent occupational accidents. In most cases, the pressure experienced by manufacturing industries due to consumer demand and competitors leads to occupational accidents. The training programme was developed based on the findings of the study which sought to answer the research question: What are the causes of occupational injuries amongst workers in the manufacturing industries of the Polokwane municipality? This chapter presents a training programme for workers in the manufacturing industries of the Polokwane municipality.

6.2 MOTIVATION FOR THE DEVELOPMENT OF THE TRAINING PROGRAMME FOR A HEALTHY AND SAFE WORKPLACE

The training programme was developed based on the findings of the current study, in which it was determined that workers in the manufacturing industries of the Polokwane municipality require health and safety training. Similar findings indicated that, amongst small and medium enterprise workers in China, there was an increase in knowledge and

practice towards health and safety at work. This resulted in a positive attitude towards work and a decrease in occupational accidents (Fu, Zhu, Yu & He, 2013).

The training programme developed focused on workers in the manufacturing industries of the Polokwane municipality. It was developed to ensure that workers are able to identify hazards and risks associated with their workplace in order to prevent occupational accidents. Activities that will take place include face-to-face teaching, group discussions, and individual tasks. Formative assessment will be done during the training session and summative assessment will be conducted after training. Training will be done in different manufacturing industries, facilitated by the researcher. The Critical Cross-field Outcomes (CCFO) as developed by SAQA and applied to the manufacturing industries of the Polokwane municipality are presented in this chapter.

6.3 THE THEORY WHICH GUIDED THE DEVELOPMENT OF THE TRAINING PROGRAMME

The training programme was developed guided by the Convergence Training's Innovative Training Solutions (2015) for Industrial and Manufacturing Training together with the Learning Theory of Knowles (1984) and SAQA guidelines. Convergence Training's Innovative Training Solutions identifies 5 steps that should be followed whilst developing a training programme for industries. Knowles' (1984) theory of adult learning was used to ensure that the needs of adult learners were taken into consideration whilst developing the programme.

The Convergence Training's Innovative Training Solution for industrial and manufacturing training theory was used to develop the training programme for manufacturing industries in the Polokwane municipality. Figure 6.1 below depicts the process that was followed during the development of the health and safety programme for manufacturing industries in the Polokwane municipality.

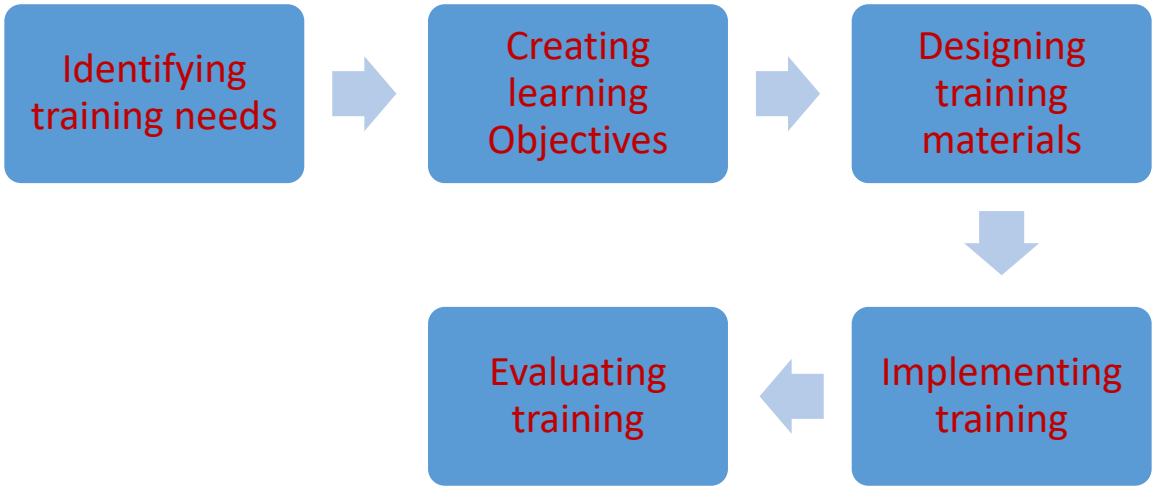


Figure 6.1 The process of health and safety training programme development.

The process, as described in the Convergence Training Innovative Training Solution for industrial and manufacturing training theory, includes identifying training needs of workers, followed by creating learning objectives, designing training materials, implementing training and then evaluating the training. The process is discussed below.

6.3.1 Identifying training needs

The training needs of workers were identified during data collection when participants were interviewed. The researcher determined that workers were negligent and did not comply with health and safety as required by OHSA (85 of 1993). In some cases, it was found that management of certain industries were detached from the activities of the industry, leaving workers to perform their duties on their own without management knowing how production is performed. A participant representing management indicated that health and safety is the responsibility of each employee and if they get injured the company is not liable.

To ensure that workers comply with health and safety regulations, the training programme included sections on hazards and risks, how to identify hazards in the workplace, and

what the responsibilities of the employee are in performing duties for the employer. Training also included how workers should assess exposures and how they can communicate the risks to relevant authorities.

6.3.2 Creating learning objectives

According to Convergence training, it should be clearly defined what the training programme would like to achieve in the end. That is defined clearly in the objectives, which explain what is expected of the workers at the end of the training. Objectives in the training programme indicate expectations of how workers will be able to perform their duties through hazard identification, exposure assessment, accident and incident investigation and how to communicate information relating to health and safety.

6.3.3 Designing training materials

The training programme is developed based on the guidelines by Convergence training and Knowles (1984), on who should be trained and how training should be done. The use of audio-visuals is described by Knowles (1984) as letting adult learners merge the known with the unknown, and understanding the learning needs of adult learners justifies the use of audio-visuals. During training, there will be tasks that workers should discuss and then present before their peers to let the researcher know if they are able to grasp what has been taught. The researcher will use the language that most workers are comfortable with but in some cases terms and phrases will be used as they appear, either on signage or labelling.

6.3.4 Implementing training

Before the training programme could be implemented it was reviewed by experts who are curriculum developers, trained health and safety officers, workers in the manufacturing industries and academics. After the training programme was corrected and validated it was then piloted amongst a small population with similarities to those in the manufacturing industry. The population were workers from the University of Limpopo that are exposed to similar hazards as those identified in the Polokwane municipality during the study.

Thereafter the programme was then implemented amongst workers of selected manufacturing industries in the Polokwane municipality.

6.3.5 Evaluating training

Designed evaluation forms will be distributed amongst those who attended the training to assist the researcher with feedback. In the evaluation form workers are afforded an opportunity to express their views regarding how difficult or easy it was for them to understand the training and what they recommend moving forward.

6.4 EVALUATION OF WORKERS

Driscoll (1994) describes learning as a persisting change in human performance or potential that is brought about as a result of the learner's interaction with the environment. All workers in the manufacturing industries of the Polokwane municipality are adults and this was considered whilst developing the learning content. Brookfield (1985) described adult learning as a process that is non-directive, where the needs of the learner are met. During the development of the training programme an adult learning theory by Knowles (1984) was used and is discussed below.

6.4.1 Knowles' Adult Learning Theory

Knowles' adult learning theory describes the six characteristics that should be considered whilst developing, training and assessing adult learners. Figure 6.2 below summarises the steps that training programme developers should consider whilst developing a training programme for adults.

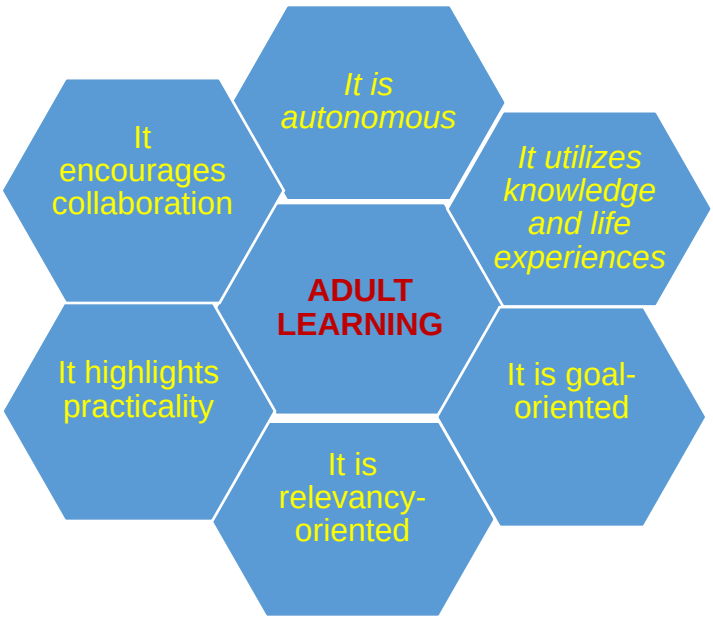


Figure 6.2 Knowles' Adult learning theory

The way adults learn new information is different to those who are much younger because adults already possess certain knowledge regarding life events. According to Knowles (1984), adults need to understand the reasons for learning something new. In his theory on adult learning Knowles (1984) indicates that practical work forms part of adult learning since adults are able to solve their own challenges. To facilitate this, they should immediately use that knowledge to indicate their understanding. To make training more effective adult learners should be accepted according to who they are and be respected.

In the manufacturing industries the workers are adults, which this type of learning theory suits best because most of them have been performing certain duties for a number of years but might be lacking skills or knowledge to best perform those duties. Knowles (1984) identified the six characteristics of adult learners. The characteristics that should be considered when offering training to adult learners are described below:

6.4.1.1 Adult learning is autonomous

Each adult learner should be viewed as a unique individual within the group because each brings a unique way of understanding issues and how to facilitate knowledge

gained. It is best to understand the learning needs of each adult learner before setting general goals and outcomes of training. Such goals should then be incorporated into one that addresses all adult learners within a particular team that will be offered training.

For the manufacturing industries in the Polokwane municipality, the training programme dealt with issues that enabled the best ways to create rapport, interact with all workers in order to understand what they know and do not know, their fears, likes, strengths and weaknesses. This was done to ensure that each worker's needs are accommodated. The purpose is to ensure that there is maximum participation during training and that each adult learner is able to apply the knowledge gained.

6.4.1.2 Adult learning utilises knowledge and life experiences

Most adult learners have their own life experiences and it is best if each of them is afforded the opportunity to link new knowledge with what is already known; a process known as known-to-unknown learning. Each adult learner should be able to relate what they already know about their duties and how best to perform that duty. Based on what is already known, new information can then be brought in to link with what is already known. Adult learners should then be encouraged to connect the known with new information. The training programme includes questions and answers where workers will be able to understand new information using what they already know.

6.4.1.3 Adult learning is goal-oriented

During the briefing session and introduction of the coarse some concerns relating to adult learners will be identified, new knowledge will then be introduced but will be linked directly with the duties adult learners are performing in the workplace. Ambiguous and difficult information can create problems if it is not directly linked with what needs to be achieved in the training, and it therefore important to focus on the goal. The purpose of the training amongst workers in the manufacturing industries of the Polokwane municipality is to ensure that, on completion of the training, workers are able to prevent occupational accidents, and the content is linked to the findings of the study.

6.4.1.4 Adult learning is relevancy-oriented

It is vital that any new information imparted to adult learners be relevant to their duties. Since goals would have been set, each learner should understand how training is relevant to the duties allocated to them at their different work stations. This was done by relating the tasks to adult workers' learning goals. Adult learners should understand how new information will benefit them and why is it important for them to learn.

6.4.1.5 Adult learning highlights practicality

Adult workers should be able to apply the theoretical concepts learned in real-life situations; their health and safety at their different sections. Through the use of audio-visuals, adult workers would be able to visualise how they could use the information when they start performing their duties. In some cases, role-playing is used to ensure that new information is relevant and can be linked to their duties. New information is paired with what they know through the use of group tasks from their work settings in order to clarify the concepts for them to then apply the information at a later stage.

6.4.1.6 Adult learning encourages collaboration

Continuous engagement with adult workers strengthens collaborations between the facilitator and adult learners. The learning environment should create a sense of belonging and acceptance for each adult learner. Adult learners should be encouraged to relate their stories, their experiences, and their wish for a better and safe working environment, which should be acknowledged at all times during training. Once they have that feeling of belonging, learning becomes interesting.

6.4.2 South African Qualifications Authority (SAQA) Unit Standards used for the development of the health and safety programme

The health and safety training programme was developed based on the SAQA Unit Standards. Figure 6.4 below indicates the SAQA Unit Standards that were applied in the development of the programme (Table 6.1).

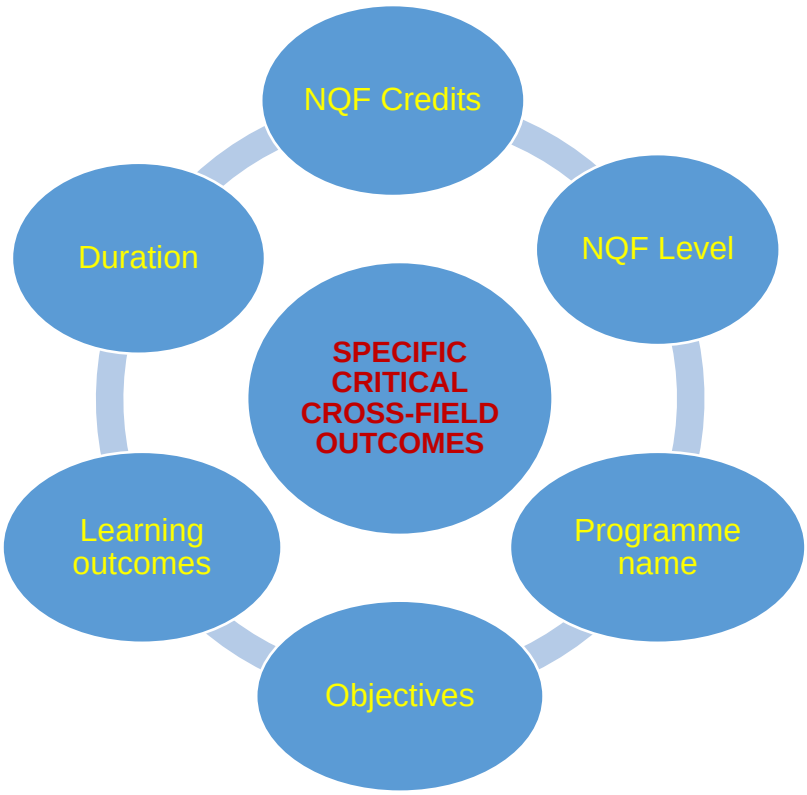


Figure 6.3 SAQA Unit Standards for the development of a health and safety training programme

Table 6.1: Learning outcomes and assessment activities

Programme name	Objectives	Learning outcomes	Duration	NQF Credits	NQF Level
Training programme to prevent occupational accidents in the manufacturing industries of the Polokwane municipality	Differentiate between a hazard and a risk Explain the steps that should be followed to identify hazards in the workplace Know the different types and uses of machinery being used in the workplace	Explain what a hazard and a risk are Apply the steps in hazard identification Indicate the differences between the types of machinery that are operated in the workplace	30 hours	3	2

SPECIFIC CRITICAL CROSS-FIELD OUTCOMES

- Recognise and resolve problems using artistic thinking through the theories learnt and tasks offered during training
- Work efficiently with others as a member of a team within their work sections
- Organise and manage oneself and one's activities responsibly and effectively in order to avoid occupational accidents due to negligence
- Converse efficiently using the correct language to indicate understanding of workplace hazards
- Utilise technology effectively and critically, showing responsibility for the environment and health of colleagues, visitors and the community
- Exhibit an understanding of the workplace and how work should be done by recognising that handling of occupational hazards is the responsibility of everybody
- Contributing as accountable workers locally by ensuring that their activities in the workplace do not endanger the health and safety of others

Table 6.2. Learning objectives and outcomes

Learning objectives	Learning Outcomes
• Comprehend the ILO safety and health convention • Understand the WHO Workplace Framework and Model • Know and apply the duties of both the employer and employee in the workplace	• Translate the WHO Workplace Framework model guidelines into practise in their workplace • Apply the ILO safety and health conventions at work • Apply the health and safety regulations according to OHSA (85 of 1993)
• Differentiate between a hazard and a risk • Explain the steps that should be followed to identify hazards in the workplace	• Explain what a hazard and a risk are • Apply the steps in hazard identification
• Understand the different categories of hazards in the workplace	• Demonstrate the ability to differentiate between different categories of hazards in the workplace • Demonstrate the ability to avoid, prevent or minimise exposure to different hazards in the workplace
• Know the different types and uses of machinery being used in the workplace	• Indicate the differences between the types of machinery that are operated in the workplace
• Know the hazards and risks linked to stationary machinery	• List the hazards and risks associated with operating stationary machinery

• Know the hazards and risks linked to mobile machinery	• List the hazards and risks associated with operating stationary machinery
• Know the different types of PPE used in the workplace • Recognise the importance and correct use of PPE	• Demonstrate the ability to appreciate the importance of PPE use
• Know and understand what working at heights is	• Show an ability to be cautious whilst working at heights
• Learn accident/incident investigation and reporting • Understand the role of an investigator during accident/incident investigation	• Compile a comprehensive accident/ incident report • Communicate identified hazards to other workers and those in management

The learning guide utilises the following symbols to differentiate between items:

Table 6.3. Symbols used in the learning guide

	Modular Content This symbol shows the beginning of the modular content
	Modules These are headings that indicate what the lesson is about
♣	Learning outcomes and Objectives These symbols indicate what needs to be achieved by the end of the module
	Content This symbols indicates the specific content for each module
	Activities These symbols indicate the activities that learners should complete after each module

Table 6.4: Modular content

Module	Study Unit	Content
Module 1 Workplace Health and Safety regulations	Unit 1 International and National Health and Safety regulations	WHO Workplace Framework model ILO Occupational Safety and Health Convection (851) 1981 Occupational Health and Safety Act (85) of 1993
Module 2 Health and Safety in the workplace	Unit 2.1 Hazards and Risks	Hazards and risks Risks
	Unit 2.2 Steps in hazard identification	Steps in hazard identification

		Assessors' guidelines during risk assessment
	Unit 2.3 Classes of hazards	Physical hazards Biological hazards Ergonomical hazards Chemical hazards Psychosocial hazards
Module 3 Hazards of machinery in the workplace	Unit 3.1 Types of machinery in the workplace	Stationary machinery Mobile machinery
	Unit 3.2 Types of hazards and risks associated with stationary machinery	Pinch points Rotating components Sheer points Pulleys Safety guidelines
	Unit 3.3	Forklifts Cranes/hoists/loaders

	Types of hazards and risks associated with mobile machinery	
Module 4 Personal Protective Equipment (PPE)	Unit 4 Types and use of PPE	Purpose of PPE Hierarchy of control
Module 5 Work performed at heights	Unit 5 Working at heights	What is working at heights Control measures for working at heights
Module 6 Accident/Incident investigation	Unit 6.1 Accident investigation	What is accident investigation What is incident investigation
	Unit 6.2 Incident investigation	Role of investigator Accident/incident report writing
Module 7 Organisational culture	Unit 7 Organisational culture	How to develop an organisational culture

6.5 MODULAR CONTENT FOR THE HEALTH AND SAFETY TRAINING

This training programme is divided into seven modules with each module having its own units. Within each unit are headings that detail the content that will be discussed with trainee workers. The content is based on the findings of the study and the purpose is to ensure that the workers in the manufacturing industries of the Polokwane municipality are able to prevent occupational accidents.

Module 1: Workplace Health and Safety regulations

Unit 1. International and National health and safety regulations

Globally, health and safety in the workplace is regarded as a priority and every workplace should ensure that workers are protected against any harm to their health and safety. Various organisations, national governments and concerned individuals have designed regulations to ensure that health and safety is understood and implemented in all workplaces. Some such organisations are WHO, ILO (2006), and the South African government through the Occupational Health and Safety Act (85 of 1993).

- ♣ Learning outcome:

Apply the ILO safety and health conventions at work

- ♣ Objective:

Comprehend the ILO safety and health convention

ILO Occupational Safety and Health Convention (No155), 1981

ILO, as an international organisation, strives for the protection of workers' rights globally. Its duty is to support social integrity and recognise human and labour rights. The conventions that ILO endorsed are to ensure that the standard of work performed by people around the world is improved.

One such conventions was the Occupational Safety and Health Convention of 1981 (No. 155) that was ratified in 2002, which requires that all employers and workers formulate a national policy on health and safety and the working environment that should be implement and reviewed. Such a policy should be developed with the purpose of ensuring that occupational accidents are prevented or minimised.

Activity

- Link the ILO safety and health convention to your work

WHO Workplace Framework and Model (2010)

- Learning outcome

Translate the WHO Workplace Framework model (2010) guidelines into practice in their workplace

- Objective

Understand the WHO Workplace Health and Safety Framework model

The World Health Organisation indicated that a healthy workplace is one where both workers and management work together in the process of achieving the goals of the industry. Both workers and management should work together to promote and improve

the conditions of work and to ensure that the workplace is free from hazards. To have a workplace that is free from hazards or where hazard exposure is minimised, management should ensure that:

- They identify and control hazards in the physical work environment.
- They improve health and safety in the psychosocial work environment by providing workers with assistance regarding their personal and social problems.
- Management should ensure that work is organised in such a way that workers are not depressed during their stay in the industry.
- Management should ensure that job demands are within the workers' ability and that the workers are rewarded for good performance. The reward system for workers' performance should be applied fairly and consistently.
- Communication in the workplace should be done in such a way that no worker feels discriminated.
- There should be means to address personal health in the workplace by providing workers with relevant resources to educate them regarding a healthy lifestyle.
- There is improvement of workers' health, their families and community through collaboration.

 Activity

List the WHO model guidelines and apply them to their workplace

 Occupational Health and Safety Act (85 of 1993)

- ♣ Learning outcome

Apply the health and safety regulations according to OHSA (85 of 1993)

- ♣ Objective

Apply the duties of both the employer and employee in the workplace

OHSA (85 of 1993) as an Act of government, strives to protect workers against hazards resulting from the workplace. Some sections of the Act are presented later in the training programme to ensure that workers are able to link them with certain activities in their workplaces.

OHSA (85 of 1993) regulations regarding hazard identification in the workplace

Section 8: Employers' duties

- Provide and maintain a workplace that is safe and without risks to the health of workers
- Eliminate or mitigate hazards before resorting to PPE
- Provide for the safe use of articles and substances
- Identify hazards and apply precautionary measures in the use of articles or substances
- Not to permit workers to work unless precautionary measures are in place
- Provide info, instructions, training and supervision
- Ensure compliance to the Act on the premises

Section 14: Employees' duties

- Take reasonable care for their health and safety and those exposed to their actions
- Carry out lawful orders given to them and obey H&S rules and procedures as laid down
- Report any unsafe or unhealthy situations to the employer or safety representative
- Report any incident to the employer or any authorised person

Activity

Name the duties of both employer and employee in the workplace based on OHSA (85 of 1993)

MODULE 2: Health and Safety at the workplace

UNIT 2.1. Hazard and Risk

- Learning outcome

List various hazards and risks in the workplace

- Objective

Differentiate between a hazard and a risk

A ***hazard*** is anything that can cause harm. In the workplace, a hazard can be a faulty machine, faulty tools, slippery floors, chemical substances or any material that a worker comes into contact with accidentally *(*Acutt & Hattingh, 2011).

A ***risk*** is the likelihood of harm occurring due to exposure to a hazard. In the workplace, using a faulty machine or a tool could lead to injury, a worker could slip and fall leading to different injuries, touching or smelling a chemical without protection could lead to skin burns or harming your organs (Acutt & Hattingh, 2011).

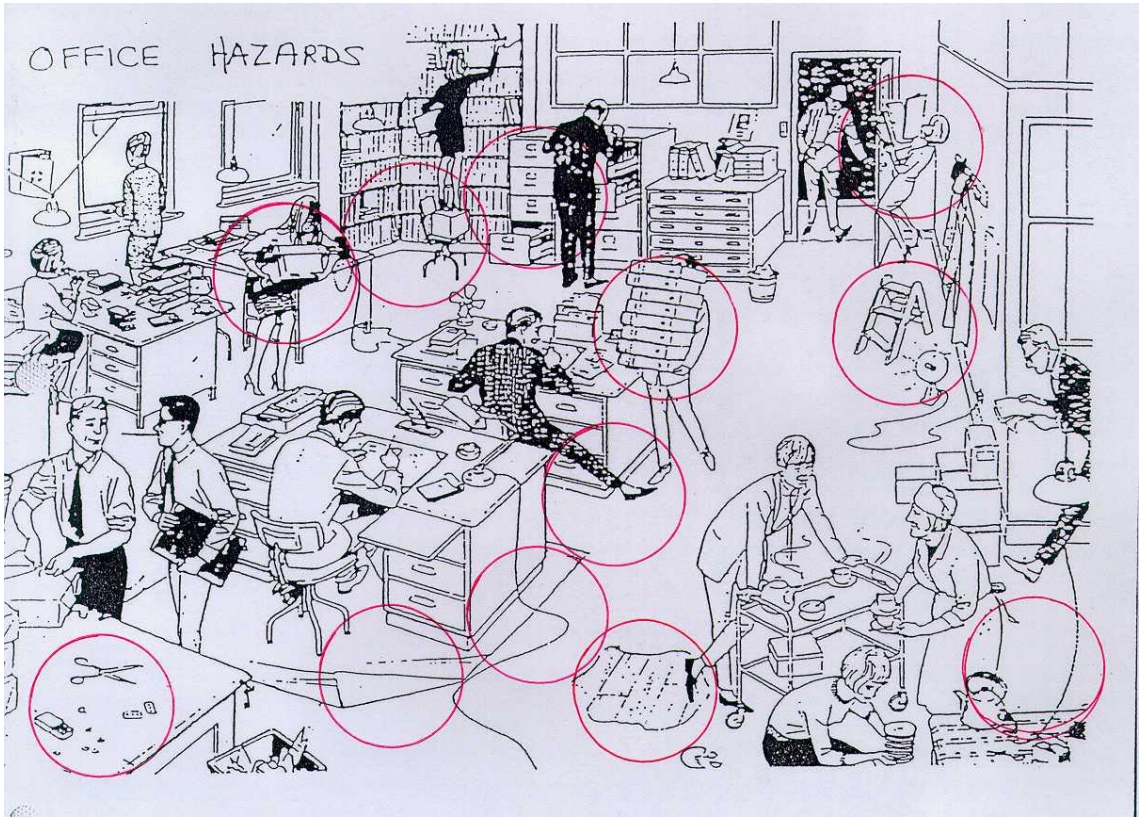
Assessment of hazards and risks is a process that involves the identification of all hazards in the workplace and their associated risks to the workers. It is a process of

evaluating a potential hazard, likelihood of suffering or any adverse health effects. The purpose of undertaking this process is to ensure that the workplace is free of any dangers that could cause harm to the exposed population.

Activity 1: Are these actions ***hazards*** or ***risks***? Explain why

Source: SA Manufacturing

Activity 2: Identify hazards that are circled on the picture by naming them and explaining the risks**.**



Source: www.eeu.com

UNIT 2.2 Steps in hazard identification

- Learning outcome

Apply the steps in hazard identification

- Objective

Explain the steps that should be followed to identify hazards in the workplace

Steps in hazard identification

- Walk around the workplace and find all conditions or actions that could cause injury or illness
- Identify all areas, situations or events that could cause injury or illness
- Look at all levels of work, including non-routine activities such as maintenance, repair, or cleaning
- Confirm that the different tasks are listed, talk to workers and supervisors
- Look at the way the work is done and explain what you found as a hazard and why it is a hazard
- Find out who might be injured and under which conditions could they be injured.

Assessors' guidelines during assessment

- Product information / manufacturer documentation
- Past experience of workers, requirements by law
- Industry policies and standard operating procedures
- Physical work environment like layout and conditions under which workers work
- The ability, skills and knowledge of workers to do the work
- Number of staff members who are exposed, how often are they exposed and the likelihood of harm occurring

Activity:

List the steps in hazard identification and explain how each step works

UNIT 2.3. Classes of hazards at the workplace

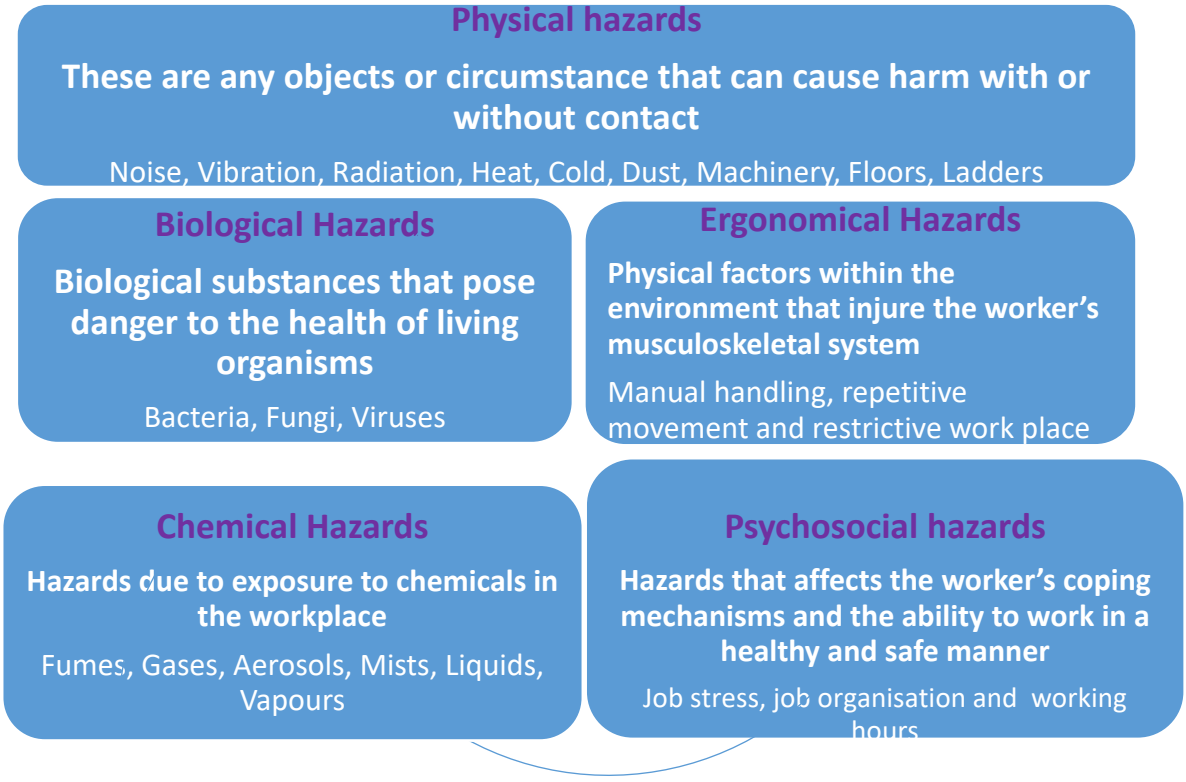
♣ Learning outcomes

- Demonstrate the ability to differentiate between different categories of hazards at the workplace
- Demonstrate ability to avoid, prevent or minimise exposure to different hazards at the workplace

♣ Objective

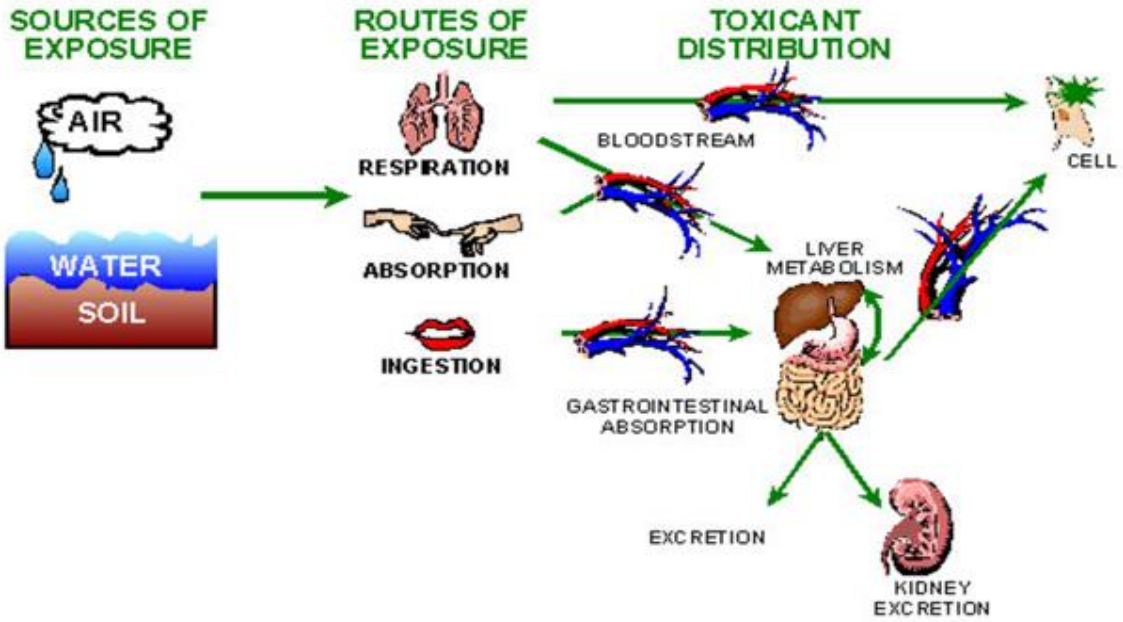
Understand the different categories of hazards at the workplace

Classes of hazards in the workplace



Source: blog.gbntc.com

Route of exposure



Source: www.seton.com

Activity:

- Name the five categories of hazards
- Explain the sources, route of exposure and potential risks of hazards after exposure from each of the categories.

MODULE 3: Hazards of machinery in the workplace

UNIT 3.1 Types of machinery in the workplace

♣ Learning outcome

Indicate the differences between the types of machinery that are operated in the workplace

♣ Objective

Know the different types and uses of machinery being used in the workplace

Machinery in the workplace includes those that are stationery and those that are mobile. Stationary machinery are those used for cutting, mixing, pulling, hoisting and packing. Mobile machinery includes cranes, forklifts, tractors and loaders. Most of these are used for operations in manufacturing industries.

- Can you name stationary and mobile machinery that you know?
- Which stationery and mobile machinery do you have at your workplace?

When operating stationary and mobile machinery take notice of the following:

- Make sure that machine guarding is in place.
- Avoid wearing clothing that is loose (ties, loose jackets or shirts, etc.)
- Ensure that you remove any jewellery
- If you have long hair make sure it is covered with a head cap
- At times machinery could become defective due to improper use by inexperienced workers or without training
- Ensure that machinery usage is clearly monitored

UNIT 3.2 Types of hazards and risks associated with stationary machinery

♣ Learning outcome

List the hazards and risks associated with operating stationary machinery

♣ Objective

Know the hazards and risks linked to stationary machinery

Hazards	Risks
Pinch points have gears and exposed moving parts on machinery	Trapped, crushed
Rotating components	Trapped
Sheer points	Trapped
Pulleys	Pulled towards machines

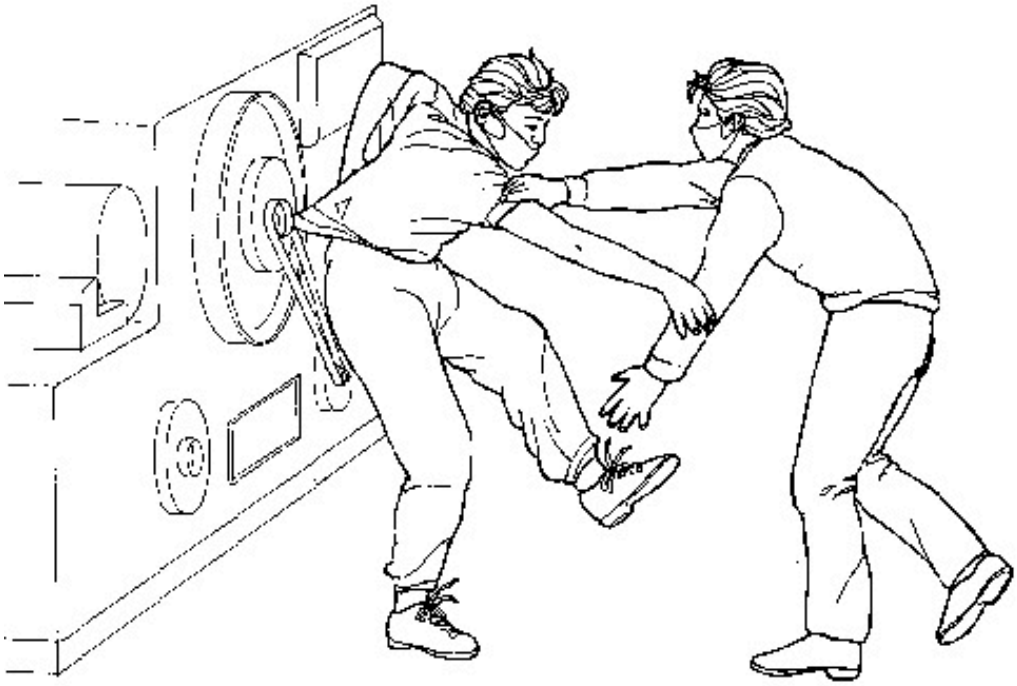
Safety guidelines

- Use appropriate machine guards
- Apply blocking or lock-out devices
- Avoid any loose clothing or jewellery
- Only trained personnel are supposed to operate these machines
- Supervisors should monitor workers at all time

Source: www.seton.com

Activities

- What type of machinery is the trapped worker working on?
- Why do you think the worker was trapped by the machine?



Source: www.slideshare.com

UNIT 3.3 Types of Hazards and risks associated with mobile machinery

♣ Learning outcome

List the hazards and risks associated with operating mobile machinery

♣ Objective

Know the hazards and risks linked to mobile machinery

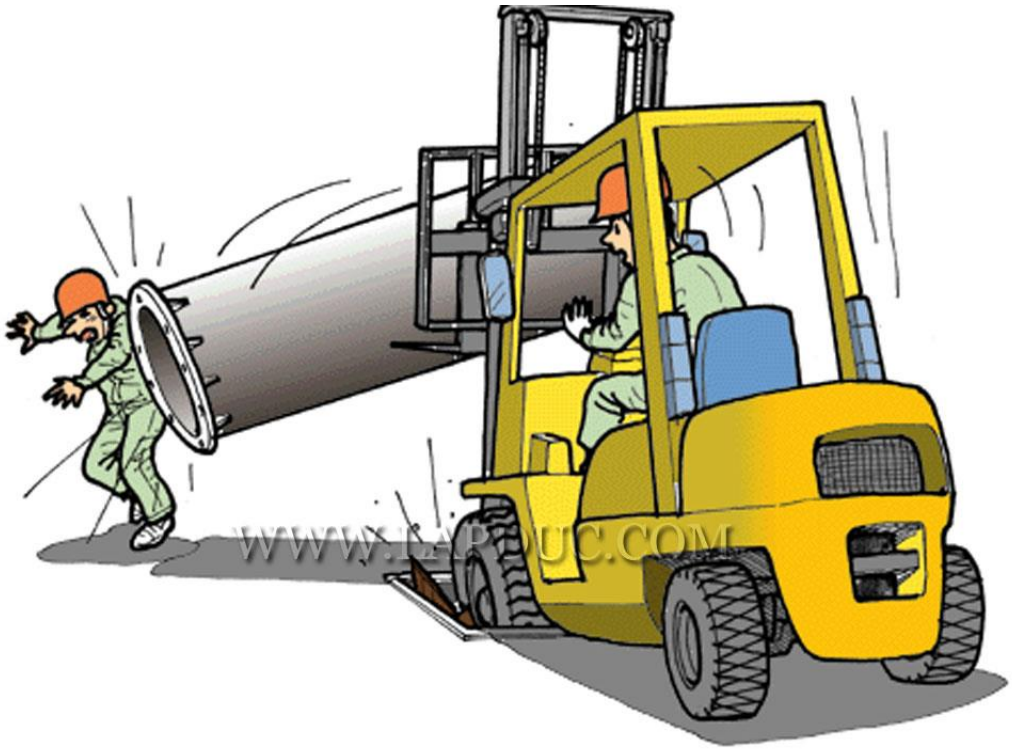
Forklifts

Hazards	Risks
Load carrying (heavy, unstable, hazardous)	Unsighted driver driving over pedestrians, forklift falling
Driving in congested areas	Crushes against objects and pedestrians
Uneven floors	Crushes due to driver being unable to control the machine

Cranes/ hoists/loaders

Hazard	Risks
Noise made by moving machinery	Crashes involving pedestrians due to machinery noise
Heavy load	Crashes involving pedestrians, buildings, electrical wires
Worn-out parts and corrosion	Become unstable and crashes

Group activity: Identify the hazards and risks below and explain why they are hazards? What do you think the people in the pictures should do to avoid the risks?



Source: www.lapduc.com

MODULE 4 Personal Protective Equipment (PPE)

UNIT 4. Types of Personal Protective Equipment

- ♣ Learning outcome

Demonstrate ability to appreciate the importance of PPE use

- ♣ Objectives

- Know the different types of PPE used at the workplace
- Recognise the importance and correct use of PPE

What is PPE?

- PPE is any equipment that workers use to protect themselves against occupational harm.
- The purpose of PPE is to reduce exposure to hazards but should be used as a last option.

- Uses

- Workers should use PPE when they are exposed to hazards that cannot be eliminated.

- Correct PPE should be supplied to workers free of charge by the employer and should be replaced once it is old or worn out.

- Different categories of hazards present different risks and require specific PPE.

- When to use it

- Workers should put on PPE every time they start their shift and should not remove it until the shift is over.

- What if it is too hot or PPE is too heavy?

- What if PPE makes my work difficult?

Activity

- What do you understand by PPE?

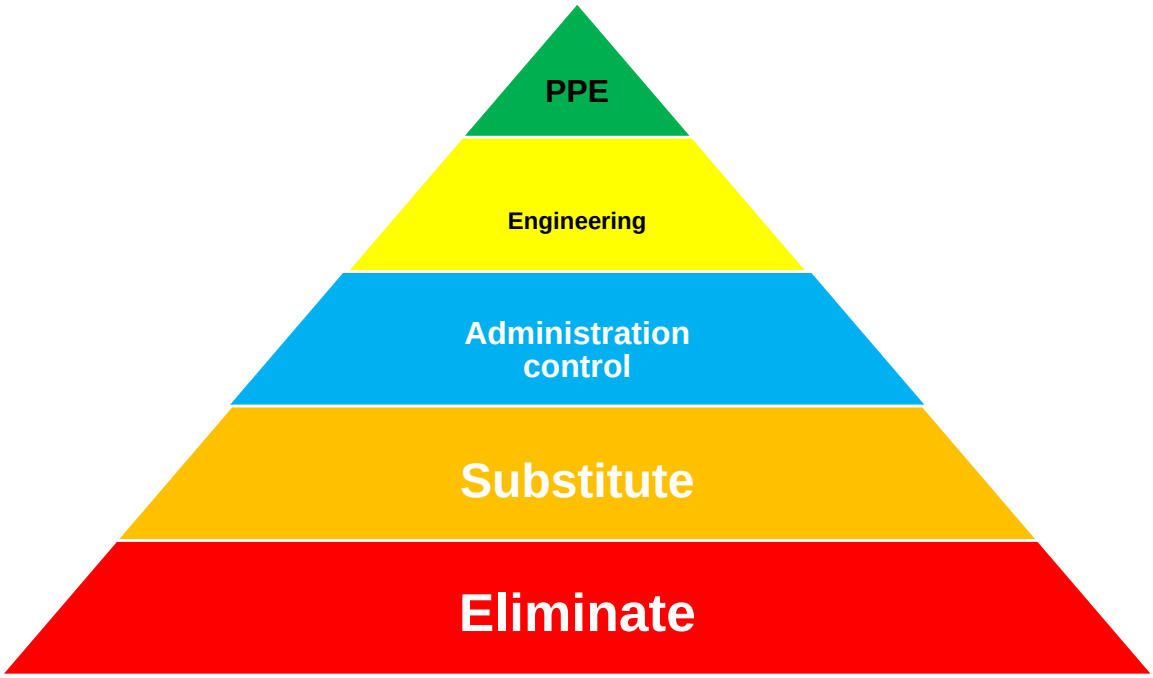
- Why do you think it is necessary to wear PPE at work?

- Are you satisfied working with PPE?

- Name the types of PPE below and indicate what they are used for?

Source: www.shutterstock.com

- Why do you think PPE should be the last option to be used at the workplace? Refer to the model below.



What do you understand about the model?

MODULE 5: Work performed at heights

UNIT 5. Working at heights

- Learning outcome

Show ability to be cautious whilst working at heights

- Objective

To know and understand what working at heights is

Working at heights is one of the leading contributors to workplace deaths and injuries. Only those with proper training should perform work at heights.

Control measures for working at heights

- Guardrails, safety harness, safety nets, stairway railings and hand rails
- Where possible conduct work on the ground
- Ensure the floors are not slippery
- Reduce as much hazards at heights as possible
- Train workers to perform work at heights

Activity: Can you identify the risks below?

Source: www.slideshare.com

MODULE 6 Accident/ incident investigation

UNIT 6. Accident/ incident investigation

♣ Learning outcomes

- Compile a comprehensive accident/ incident report
- Communicate identified hazards to other workers and those in management

♣ Objectives

- Learn what accident/incident investigation and reporting is
- Understand the role of an investigator during accident/incident investigation

What is Accident/incident investigation

Accident/incident investigations are activities undertaken to determine the causes of occupational accidents that might have led to injuries or destruction of property. Accident/incident investigation is a process where an investigator determines what could have caused an accident or any damage to machinery or property. The purpose is for investigators to advise management in order to plan ahead.

Aa an accident investigator you need to thoroughly discover what happened, and how and why it happened; this is not a fault-finding exercise. These activities are undertaken to prevent recurrence in future and to develop control measures.

Legislation

The Occupational Health and Safety Act (85 of 1993) serves as a guide on how the workplace should be kept free from hazards and what steps should be taken

Requirements during accident/incident investigation

For the investigator, the following process should be followed when determining the cause of an accident/incident:

√ Who was involved?

√ What happened?

√ When did it happen?

√ Where did it happen?

✓ Why did it happen?

✓ How did it happen?

The investigator should not conduct the investigation with the purpose of finding fault with whoever caused or was involved in the accident but should focus on finding facts about the cause.

Conducting the investigation:

✓ Respond to the accident/incident immediately after receiving the message

✓ Seal the area

- Ensure that nobody is allowed in the accident/incident area except those authorised
- Check if the area has been tampered with (cleaning, maintenance or during first-aid)

✓ Find out what caused the accident

- Draw a sketch of the accident/incident area
- List the type of tool/equipment that was used during the accident/incident
- List the number of employees, duration of work shift and task frequency and duration
- Indicate the time that the accident/incident happened
- Indicate the activities that are supposed to be executed at the place of the accident/incident
- Use arrows to show directions of what might have happened
- Indicate the position of machinery/equipment during the accident/incident
- Indicate the position of witnesses during the accident/incident

√ Find out if there were direct or indirect causes (or both)

- Did the workers perform work in an unsafe manner?
- Did the worker fail to follow standard operating procedures?
- Was the worker operating faulty machinery?
- Was the supervisor around during the accident/incident?
- Was the worker capable of performing the task (training, skills)?
- Are there warning signs for workers within the work area?
- Use previous health and safety records of the organisation to assist you with the investigation.
- Once you have completed your investigation, report the accident to the line manager or supervisor.

√ Check for physical evidence

√ Conduct interviews with those involved; supervisors, workers, witnesses and those who are familiar with the work area

- Ensure that the investigation, including the interviews, are conducted within 24 hours after the accident/incident
- Interviews should be conducted in a quiet place
- Prepare interview questions
- Probe for more clarity
- Allow interviewees time to respond without interruptions
- Restate the interviewees' responses to them before closing the session

√ Compile a list of injuries, damage to property, equipment and machinery

✓ Where possible take pictures of the scene (with permission)

- Take pictures at the scene as you found it. Do not replace any item that was removed after the accident/incident

✓ Analyse those facts and

✓ Write a report

- Focus on root causes:
- Was it lack of clear policy and expectations
- Lack of line management accountability
- Insufficient commitment by senior management
- Inappropriate OH organisation
- Confused roles and responsibilities
- Inadequate resources
- Ineffective training and awareness
- Occupational health activities not aligned to business requirements
- Failure to periodically measure performance
- Failure to take appropriate action or follow up

✓ Recommendation

- Recommendations should be based on the findings

MODULE 7

UNIT 7. Organisational culture

- Learning outcome

Apply the required steps in developing organisational culture.

- Objective

Understand the role that management should play in developing organisational culture

 Organisational culture

Organisational culture is the way an organisation positions itself regarding how members should conduct themselves. This is embedded in the organisation's Mission and Vision statement.

 How to develop an organisational culture

Management is expected to display the following to ensure that the desired culture is achieved.

What culture is required for an organisation

- Describe the Mission and Vision of the organisation to workers
- As a leader you should be open with regards to what you do and be transparent

- The working relationship with all stakeholders should be acceptable
- Be a curious leader
- Encourage teamwork from workers
- Allow workers to be innovative and do not restrict their thinking
- Encourage dialogue and allow everybody to express themselves
- Be a role model
- Ensure that the way you behave in the organisation is exemplary
- Be visionary
- Develop a vision and strategies for the organisation
- Ensure that workers understand their responsibilities
- Build spirited teams
- Communicate properly with everybody
- Share the information with all workers

 Learning activity

Explain how management can develop organisational culture?

_____
_____
_____
_____
_____
_____
_____

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6.7 Workers' assessment based on the developed health and safety programme

Question 1

A. What does PPE mean?
   a) Personal Protective Equipment
   b) Private Personal Equipment
   c) Protective Public Equipment
   d) All of the above.

B. Who do you think is responsible for health and safety in your workplace?
   a) Workers
   b) Workers, Managers and Supervisors
   c) Health and Safety Representatives
   d) All of the above

C. What steps will you take if you are not happy with safety in your workplace?
   a) Just ignore it and keep safe yourself
   b) Go on strike
   c) Watch who might be hurt
   d) Inform your colleagues and then report it to your supervisor or manager immediately

D. Why do you think health and safety training is important?
   a) To get a certificate
   b) Because some machines and tools might be old
   c) Every worker should be trained by law
   d) Your employer has more funds

E. How are hazards at your workplace assessed?
   a) Inspections by safety representatives
   b) Safety meetings
   c) Frequent audits
   d) All of the above

F. If you get injured whilst working what should you do first?
   a) Leave for home
   b) Ensure that the injury is attended to by the nurse on site or nearby clinic?
   c) Complete an injury form and go home
   d) None of the above

G. If your supervisor or manager instructs you to perform a task that is unsafe what should you do?
   a) Obey the instructions
   b) Call an experienced worker to do it
   c) Resign
   d) Refuse and tell him it is unsafe

H. Who do you talk to if you have questions regarding health and safety at your workplace?
   a) Your health and safety representative
   b) Your supervisor
   c) A member of your health & safety committee
   d) All of the above

I. As you are working you realise that there are hazards at work that need attention. What should you do?
   a) Wait until somebody is harmed
   b) Report it immediately
   c) Ignore because you might not be harmed
   d) Ask your colleague what to do

J. Below are categories of hazards but one of them is not. Which one is not a category of hazards?
   a) Chemical
   b) Biological
   c) Physical
   d) Witchcraft

K. Why do think all accidents at the workplace should be investigated and recorded?
   a) Ensure that accidents never happen again
   b) Comply with the law
   c) Scare workers
   d) All of the above

L. How can workers working in a noisy area be protected against noise?
   a) Have rest periods between working on the machine
   b) Stop the machine On and Off all the time
   c) Provide relevant PPE
   d) None of the above

M. How best can injuries at work be minimised?
   a) Remove the hazard or provide protection for workers
   b) Never allow anyone close to the hazard
   c) Train workers to be aware of what hazards are and how to deal with them
   d) Both A and C

N. If you work at heights, who is responsible for the provision of the fall protection system?
   a) Employer
   b) Workers
   c) Manufacturer of the fall protection system
   d) Both A and B

O. When should fall protection equipment be inspected?
   a) Before you start using it
   b) Monthly
   c) Weekly
   d) When a new employee joins you

P. What do you think should be checked on the surface where a forklift is operated?
   a) Surfaces that are slippery and uneven
   b) Any obstruction
   c) Load capacity
   d) All the above

Q. How do chemicals enter the body?
   a) Ingestion
   b) Absorption
   c) Inhalation
   d) All of the above

R. When do we require PPE?
   a) When an employee suffers an injury
   b) When an employee asks for it
   c) When it is too risky for workers and there is little protection against hazards
   d) Both A and B

S. When working in areas where you might have head injury from falling objects
   a) Keep checking in case you get hurt
   b) Request your colleague to inform you if something falls
   c) Wear protective head gear
   d) Stop working at that area

T. When do you think eye protection is required?
   a) When there are flying particles
   b) To protect against liquid chemicals, acids or caustic liquids
   c) To protect against chemical gases or vapours
   d) All of the above

U. You should not do one of the following when working with power tools?
   a) Ensure that hoses and cords are kept away from oil, heat, and sharp edges
   b) You should pull the hose or the cord to disconnect it from the holder
   c) Make sure you secure work with a vice or clamps by keeping both hands free to use the tool
   d) None of the above

20 Marks

Question 2

State whether each statement is True or False

A. Once your employer has provided you with PPE, you must use it whenever you are at work, even if your job changes.

a) True
b) False

B. It is still correct to use a hard hat with a minor crack in its shell.

a) True
b) False

C. Machine guards should be fitted to protect the operator and other workers

a) True
b) False

D. Any worker, even if you are inexperienced, can remove safeguards from hand and power tools

a) True
b) False

E. Electric tools should not be used in damp or wet locations.

a) True
b) False

5 Marks

Question 3

Match Column A with B

Column A	Column B
1. What is OHSA (85 of 1993) according to your understanding?	a. Until they are no longer safe to protect you
2. What do you think is the cause of most accidents at work?	b. Anything that might cause harm to workers
3. For how long can you use the correct gloves to protect you from the chemicals?	c. Slips, trips and falls
4. What do understand by a hazard?	d. The end of the year
	e. South African Health and safety legislation
	f. Organisation of Health Society Administration

8 Marks

Question 4

Arrange the following hazard identification steps according to their order.

- Walk around the workplace and find all conditions or actions that could cause injury or illness
- Identify all areas, situations or events that could cause injury or illness
- Look at all levels of the work, including non-routine activities such as maintenance, repair, or cleaning,
- Confirm that the different tasks are listed
- Talk to workers and supervisors
- Look at the way the work is done
- Explain what you found as a hazard and why it is a hazard
- Find out who might be injured and under which conditions they could be injured

8 Marks

Activity: List all the possible hazards you see in the picture below:

6.6 VALIDATION OF THE TRAINING PROGRAMME

Validation of an instrument is a process used to collect and analyse data to determine its accuracy and relevance (Chinn & Kramer, 2011). For this study, a health and safety training programme was developed and before it could be implemented, the researcher validated it against Chinn and Kramer's (2011) standard evaluation criteria.

6.6.1 Purpose for the validation of the training programme

The developed training programme was validated in order to:

- Verify whether the training programme is in line with the needs of workers in the manufacturing industries of the Polokwane municipality;
- Determine whether the recipients' or their representatives were satisfied with the content;
- Afford the recipients or their representatives an opportunity to express their views regarding the training programme;
- Determine if there is any need for the training programme to be improved.

6.6.2 Validation process

The validation process was done in March and April 2018, after the study findings were finalised and the training programme developed. To validate the developed health and safety programme, semi-structured interviews were conducted amongst 8 participants; 5 supervisors and one manager from the manufacturing industries of the Polokwane municipality and 2 health and safety experts from two training institutions in the city of Polokwane.

Each interview with the 8 participants lasted at least two hours and time was allowed for the participants to go through the training programme. The interview sessions started with presentation of the study findings to allow the participants time to understand what advised the development of the health and safety programme. The interviews were voice-recorded to capture all the information during the sessions.

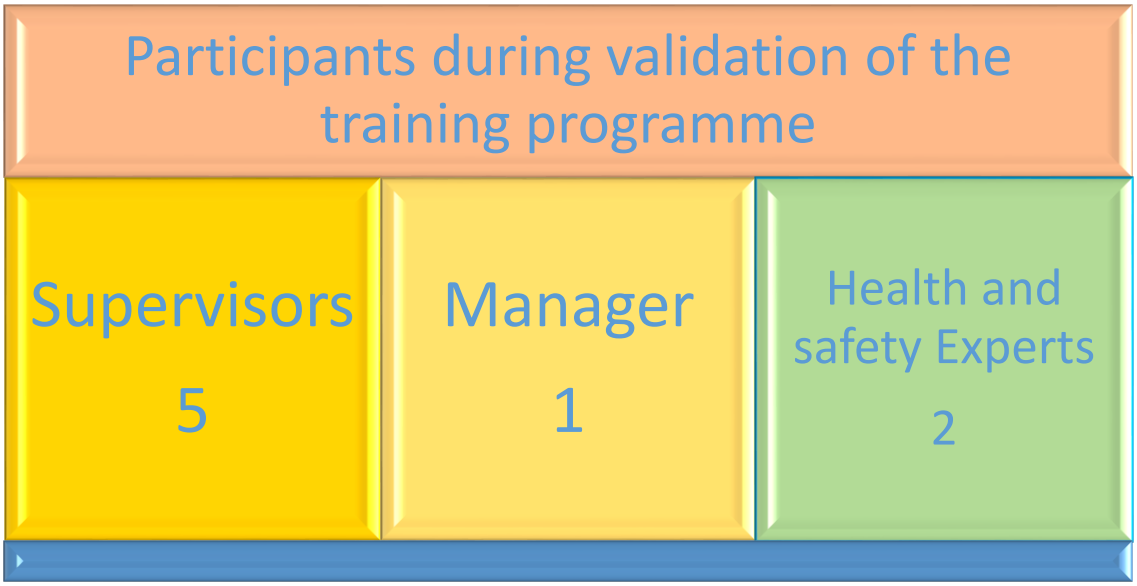

Figure 6.4 Participants during validation

The 5 supervisors and one manager were conveniently selected and their inclusion was because they have knowledge regarding health and safety in their respective workplaces; they knew the training needs of their workforce as they interact with them daily.

The reasons for including the two health and safety experts was because they are trainers and have extensive knowledge regarding the development of training programmes. Their training institutions are accredited and they have offered health and safety training for some time in the province and beyond.

6.6.3 Validation process key indicators

The validation process centred around 6 key indicators that guided the developer to achieve the goal of validating the training programme. The six indicators were:

- Whether the basic needs of workers are addressed
- Whether the basic needs of supervisors were addressed
- Whether the basic needs of management were addressed

- Is there consideration for adult learners?
- Is the delivery techniques of the training programme adequate and clear?
- Is the duration of the training enough?

6.6.4 Standard evaluation criteria

To ensure credibility of the evaluation process, the five standard evaluation criteria, as indicated by Chinn and Kramer (2011), were used. The five evaluation criteria are clarity, simplicity, generality, accessibility and importance.

Each criterion is explained below:

6.6.4.1 Clarity

To ensure clarity in a programme, the concepts that are used should be clearly defined for the users to understand the content. The concepts should be defined at the beginning of the programme and be described within the context under which they are going to be used. To clarify issues in the programme, diagrams and pictures should be consistently used.

6.6.4.2 Simplicity

Simplicity refers to the use of few concepts in the programme to avoid crowding the document with many concepts that learners might be unable to assimilate. The concepts that are used should be coherent with each other.

6.6.4.3 Generality

Generality refers to the scope of programme application and the purpose for which the programme is designed. The bigger the scope of the programme the better as the programme should not be confined to a limited target population.

6.6.4.4 Accessibility

The designed programme should be accessible to whoever would like to use it.

6.6.4.5 Importance

The developed programme should add value to the people who will use it. The content of the programme should be designed in such a way that, after using it, new knowledge

and skills will be added. To some extent behaviour change should be expected from the targeted audience.

6.7 VALIDATION FINDINGS: SUPERVISORS

The was general consensus from all supervisors and managers that the health and safety training programme will assist them in either reducing or preventing occupational hazards in their workplaces.

This was indicated by the response of one of the supervisors who said:

> S 1: Yes, this covers almost everything that we wanted to assist our workers. I think it is spot-on because it uncovered what workers are missing, it goes beyond our expectations.

Another supervisor indicated that as supervisors they thought that they had adequate knowledge regarding safety issues but the training programme unearthed a lot of issues that they did not consider serious. The supervisor said:

> S 2: This document contains even the little things that some of us thought were not serious issues. I never thought a Vision of a company is important to issues of health and safety and I never thought management should be as hands-on as some of us workers.

Regarding whether the training programme was important to management, one supervisor indicated the importance of the programme by saying:

> S 3: …very important to have a healthy and safe work environment, we need management support big time. I hope after reading this document they will allocated more budget for safety issues, this is an eye-opener.

This was corroborated by the manager who said:

> M 1: This programme is very helpful because some of ours are not trained in this, we are managers because we have certain skills but they are not safety related. At least this gives us a picture of what is required for a safe workplace.

Adult learning is one of the key factors that was considered during the development of the training programme and supervisors and a manager were asked if that aspect is well covered in the training programme.

A supervisor explained his views regarding this by saying:

> S 4: I like the frequent use of pictures because some of our workers could not concentrate for long time due to age, they are no longer as sharp as before and the pictures will help them understand. The language that was used is simple and understandable even to us supervisors.

Although the supervisors and the manager were satisfied with the overall training programme, some were of the opinion that the training programme was too broad.

They suggested an industry-specific training programme as one of the supervisors explained:

> S 5: This document addresses challenges that are found in all industries but for me I would have liked it if it was specific to one workplace. Like in our industry we do not have work at heights. All-in-all it is good but I feel it should be focused on each industry.

There were reported challenges regarding the duration of the training programme, as some supervisors felt that it was too long and it would require two days to complete

the training. They reported that two days away from work will affect production and will not sit well with management.

One supervisor explained this by saying:

> S 3: I am worried about the time the training is going to take. Production is not supposed to stop for that long and so if we can get information how to do training in one day it will be fine.

6.8 REPORTED FINDINGS FROM HEALTH AND SAFETY EXPERTS

The two experts were generally satisfied with the training programme and one of them commended the inclusion of the topic 'Organisational Culture' in the training programme. The expert explained by saying:

> E 1: I don't know how we missed this (pointing at the training manual), this is very important for workers to understand how organisations operate.

The expert further indicated how important it is to have this type of training programme:

> E 1: One never stops learning, every time you read a document on safety it is like new information and it adds value.

Another expert indicated how impressed he was with the findings and the training programme. He expressed this by saying:

> E 2: This study unearthed a lot of hidden information. It covers even those small areas that most of us were unable to uncover and the training programme will assist us in being more alert in future.

The expert further indicated his satisfaction with how adult learners were considered when developing the training programme:

> E 2: I like the way the programme was designed, especially for our older generation of workers who some of them are unable to concentrate for long but these pictures and diagrams will help them.

Both experts suggested the rephrasing, removal or addition of certain statements in the training programme as indicated in Table 6.3

Table 6.3 Recommendations from experts regarding the health and safety training programme

Unit	Identified statements/items in the training programme	Recommended amendments
Unit 2.3	Classes of hazards at the workplace	Add fire hazards as another class of hazards
Module 4 Unit 4	The safety model hierarchy	Swop admin control with engineering, making admin control 3rd and engineering 4th in the hierarchy

Module 6	• Bullet 5 indicates taking of pictures at the scene of the accident/incident • Interviewing of witnesses • Only the safety officers to be involved in accident/incident investigation	• Add 'Respond positively to the person who reported the accident' • First seek permission to do that • Include interview guide to be used • Include Safety officer, SHE rep, employer, specialist (engineer), Union member or inspectors
Module 7 Unit 7	Under Organisational culture; Be a role Model	Add a statement 'Always be visible to workers, walk around'
Assessment	Question R: When do we require PPE?	Rephrase Option C to 'When all other control measures fail'

The two experts recommended that there should be amendments to the health and safety training programme. This was after they reviewed the developed health and safety training programme for the manufacturing industries of the Polokwane municipality. The recommendations as reflected in Table 6.3 were effected in the final health and safety training programme for the manufacturing industries of Polokwane.

6.9 CONCLUSION

The supervisors, managers and health and safety experts who participated in the evaluation of the training indicated that the developed health and safety training programme was necessary for workplaces as it addresses the needs of all role players in the industries. They further indicated that it is valuable and well designed. All

participants offered recommendations where they found that certain information was either missing or was not clearly captured in the training programme.

Table 6.4 Concerns raised by supervisors and experts and how they were addressed

Concerns by supervisors and experts	Responses
Duration of training	• The length of the content in the training programme could not be reduced because it will compromise the quality. The training programme was developed based on the findings of the study and removing certain information might not be helpful. • The training programme is for management, supervisors and workers and training could therefore be divided into three sessions at different times.
The training programme to be industry-specific	• The training programme could not be designed according to each industry because, even though some industries do not have work at heights, certain hazards identified whilst working at heights, like manual handling of heavy objects and being struck by an object, still affect all industries. • It is recommended that further research be conducted with focus on specific industries.

Rephrasing of certain statements/items recommended	All recommendation regarding the rephrasing of certain statements and items were effected in the new version of the training programme that is available for all interested manufacturing industries

Supervisors and experts raised some concerns regarding certain items in the developed training programme (Table 6.4). They indicated that the time to be allocated for training seemed to be too long. The recommendation was noted but it was realised that, should the duration be reduced, some of the contents would have to be removed from the training programme, which would compromise the quality and defeat the purpose of the training programme. The recommendation is that since the training programme was developed for management, supervisors and workers, different dates could be allocated for each category.

Another concern that some supervisors raised was that the training programme was supposed to be industry-specific. This was because some of the findings were from industries with different trades and thus do not apply to them. The concern was noted but since the training programme was developed with the purpose of reducing or preventing occupational hazards in all manufacturing industries, it would be an advantage to other industries to identify challenges that are experienced in other industries. Some of the challenges occur in all industries even though their trades differ.

Challenges experienced by workers working at heights are similar to those workers whose industries do not have work conducted at heights. Challenges such as carrying heavy objects and manually handling material apply across all industries. The only difference is that some workers perform their work at heights, whereas others do not; however, there are some similarities as the workers perform their duties.

There were certain items in the training programme that supervisors and experts recommended should be rephrased for clarity purposes. Items such as the exchanging of Administration control with Engineering control on the hierarchy of control were recommended and changed as recommended. Other recommendations included the

rephrasing of certain questions in the assessment section of the training programme. Some of the questions were not clear and would have confused workers as they were responding to the questions during assessment after training.

Table 6.5. Summary of how the standard evaluation criteria were applied in the developed health and safety training programme

Criterion	What the criterion is about	How the criterion is addressed in the health and safety training programme
Clarity	How clear are the concepts in the training programme?	• At the beginning of the training programme, concepts are clearly defined and relevant sources indicated. • The training programme has diagrams and pictures that will assist the trainees to understand the concepts and topics clearly.
Simplicity	How are concepts used in the training programme that makes it simple to comprehend?	• Few concepts are used in the training programme and they relate to each other. • Each unit feeds into the next unit and it is easy to link them to previous units.
Generality	How general is the scope of the training programme?	• The content of the training programme covers all categories of manufacturing industries.

Accessibility	How easy is it for the training programme to be accessed by all those who would like to use it?	• The training programme will be made available to those who would like to use it on the internet and in libraries.
Importance	What value will the training programme add to those who will be using it?	• Based on the findings of the study, all those using it will benefit from the information that is in the programme.

Table 6.5 describes the summary of how the standard evaluation criteria were applied in the developed health and safety training programme, according to Chinn and Kramer (2011). The evaluation standard above indicates each of the five criterion, what each criterion addresses, and how each criterion was addressed in the developed training programme.

6.10 CONTRIBUTION OF THE STUDY

The findings and report will add to the knowledge and information, found to be missing, in the manufacturing industries of Polokwane and beyond. The study will contribute in the following way:

- √ This is the first study of its kind in South Africa and one of very few in Africa.
- √ Only one of the twelve manufacturing industries that participated in the study had a health and safety training programme and the developed and validated health and safety training programme is available to all manufacturing industries in the Polokwane municipality.
- √ The information that is contained in the training programme is rich in information and is user-friendly.

- √ The themes and sub-themes that the study yielded are able to assist management, policy-makers, workers and regulators to develop strategies on how to mitigate challenges faced by industries in the implementation of health and safety regulations and to ensure that workplaces are healthy and safe for all those who are exposed to work activities in the industries.

- √ It has also been identified that in the Limpopo Province, there has never been any study conducted to determine the causes of escalating occupational accidents. On the African continent, most studies were focused on the construction industry, whereas manufacturing industries were left out.

- √ The study yielded at least 20 sub-themes and each sub-theme could be turned into further studies.

CHAPTER 7

SUMMARY, LIMITATIONS, RECOMMENDATIONS AND CONCLUSIONS

7.1 INTRODUCTION

This chapter presents a summary of the study findings, the limitations, recommendations and conclusion of the study that was conducted amongst selected manufacturing industries of the Polokwane municipality. The chapter further presents the contribution of the study to the manufacturing industries of the Polokwane municipality and other industries with similar characteristics. The findings are based on the research question '**What are the causes of accidents in the manufacturing industries of the Polokwane municipality'.**

7.2 RESTATEMENT OF THE RESEARCH PROBLEM

According to the occupational accidents statistics from the Department of Labour in the Limpopo Province, there was a rise in accidents in the manufacturing industries of the Polokwane municipality. This was despite the fact that there were continuous compliance inspections, health and safety regulations, and health and safety policies.

7.3 RESTATEMENT OF THE STUDY AIM AND OBJECTIVES

The aim and objectives of the study are summarised below:

7.3.1 Aim of the study

The Aim of the study was to develop a training programme to support manufacturing industries of the Polokwane municipality

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7.3.2 Objectives of the study

The study objectives that guided the study were:

- To evaluate health and safety programmes in the manufacturing industries of the Polokwane municipality;
- To describe the factors leading to occupational accidents in the manufacturing industries of the Polokwane municipality;
- To identify training needs of workers in the manufacturing industries of the Polokwane municipality.;
- To develop a health and safety training program for manufacturing industries in the Polokwane municipality with regard to the prevention of accidents;
- To validate the training program after implementation in the manufacturing industries of the Polokwane municipality.

All the study objectives were achieved as indicated in Chapter 4 to Chapter 6. The researcher evaluated the health and safety programmes of the selected manufacturing industries in the Polokwane municipality. It was found that only one manufacturing industry, out of the 13 that were selected for the study, had a health and safety training programme.

Based on the review of the health and safety training programmes of the manufacturing industries, observation of the physical work environment of the manufacturing industries, and interviews with general workers, supervisors and managers, the findings yielded themes that assisted the researcher to identify the training needs of workers. Theme 4.3.3 revealed that there was a need to develop a training programme. A training programme was developed based on the training needs that were identified during data collection. Convergence Training's Innovative Training Solutions (2015) for Industrial and Manufacturing Training together with the Learning Theory of Knowles (1984) and SAQA guidelines were used to develop the training programme. The training programme was later validated amongst supervisors and managers from the manufacturing industries in the Polokwane municipality and

two health and safety training experts from health and safety training institutions in Polokwane.

7.4 SUMMARY OF STUDY FINDINGS

The study utilised three methods of data collection; review of health and safety training programmes, observation of study sites and interviews that were done amongst general workers, supervisors and managers. The three data collection methods complemented each other in gathering the required information.

7.4.1 Summary of study findings from the review of the health and safety training programmes

It was found that, out of the 13 manufacturing industries from the Polokwane municipality that were part of the study, only one manufacturing industry had a training programme. Most of the 12 manufacturing industries that did not have a health and safety training programme were not aware that they should have one. Other industries were not even aware that workers should be trained frequently on health and safety.

7.4.2 Summary of study findings from observations

The researcher used a checklist adopted from Bonell (2009) to observe the 13 study sites selected for the study. The researcher used the guidelines to observe the protection of workers working at heights, the correct use of PPE, and the working area.

7.4.2.1 Protection of workers working at heights

Based on the observations, it was found that only 4 of the 13 manufacturing industries had workers working at heights. The following were found from the 4 manufacturing industries with workers working at heights:

- Only one out of the 4 manufacturing industries had a fall protection plan for their workers;
- All 4 manufacturing industries communicated hazards and risk control to all their workers working at heights;

- Training on working at heights was found to be offered in only two manufacturing industries;

- It was also found that in all four manufacturing industries, the workers carried heavy objects up and down the stairs.

7.4.2.2 The use of PPE

It was determined from the observations that in 8 manufacturing industries of the Polokwane municipality, workers were using PPE; whereas in the remaining 5 manufacturing industries workers were not.

7.4.2.3 Working space

The findings during observations revealed that 9 manufacturing industries did not have enough working space for all their workers. The working areas were congested with limited moving space, with spaces allocated for administration, production, storage and dispatch.

7.4.3 Summary of findings from interviews

The findings from interviews yielded five themes from general workers and two themes from both managers and supervisors in the manufacturing industries from the Polokwane municipality. All 7 themes are summarised below.

7.4.3.1 Summary of themes from general workers

- Existing hazards in the work environment that workers are exposed to

The study found that there were existing hazards in the physical work environment. Some of the identified hazards accounted for occupational accidents in the manufacturing industries because workers were exposed to them on a daily basis. It was found that machines were old and never replaced, others were faulty while others were only serviced after a long time or if they stopped working.

There were also physical hazards within the physical work environment that posed health risks to the workers. Physical hazards like noise, dust and heat were also identified as health hazards for workers in the physical work environment of the manufacturing industries in the Polokwane municipality.

Other existing hazards in the physical work environment that were identified were chemicals. Workers were exposed to different types of chemicals that they use during production and the protective equipment like gloves and masks provided to them could not prevent exposure as they were either worn out or inappropriate. Furthermore, it was found that there were workers who worked at heights and were not offered enough protection. Protective devices like handrails and guardrails were not provided to workers in some manufacturing industries and some industries did not have fall protective plans for the workers. Manual handling of heavy objects up or down the stairs was also determined to be an existing hazard for workers working at heights.

- Descriptions related to workers' conduct during performance of tasks and the consequences thereof

The conduct of workers during their shifts was found to pose health and safety risks to other workers. Most workers were reported to be negligent and acting in an unsafe manner when executing their duties. There were instances where their negligent and unsafe manner of executing their duties led to accidents at work. Some of the workers who were responsible for causing some occupational accidents due to their unsafe acts were found not to be negligent, but they were unable to execute tasks given to them. This was because the workers did not have the necessary knowledge and skills but were instructed to perform the duties anyway.

Workers' lack of awareness towards health and safety during work was reported to be a challenge. Most workers were reported not to be aware of the consequences of their unsafe acts. Some were operating heavy machines or handling hazardous material.

- Training related to performance of duties by workers

The majority of workers in the manufacturing industries of the Polokwane municipality were reported to be lacking health and safety training. This was evident in the way that they executed their duties. Most workers performed their duties in an unlawful and unsafe manner because they did not possess the necessary skills and knowledge to execute their duties. Workers' unlawful and unsafe acts, due to lack of on-the-job training, led to poor performance and compromised health and safety in the workplace.

There were some workers who were trained to perform certain tasks but the training was insufficient. In some instances, training was offered in the form of morning talks or meetings once a week and the focus was more on production. Such workers who only received small talks were unable to transfer such information to their work stations where there were hazards. Some of the equipment, materials or machinery required certain skills that they did not have. Transferring learned skills to the workplace led to some workers becoming frustrated with their work.

Some of the workers in the manufacturing industries of Polokwane municipality reported that they did not require training because they have work experience. They regarded training as a waste of resources because they were able to execute their duties without any challenges.

- Report on provision, utilisation and compliance to PPE described

It was found that the provision, utilisation and compliance to PPE use were challenges faced by workers in the manufacturing industries of the Polokwane municipality. Workers reported that they were provided with incorrect PPE, which exposed them to different hazards at work. It was reported that management provided them with general PPE even if some of the hazards they were exposed to were more harmful and required specific PPE.

Some workers reported that it was a challenge to be provided with PPE, especially those working in high risk areas. Some of the workers had to either buy PPE themselves or they had to use their own clothes as PPE. In instances where correct PPE was provided, it was not enough to sustain workers for the whole year. There were also reported cases where workers were provided with correct PPE regularly but workers themselves were not utilising it. Workers reported that PPE was slowing them down or it was uncomfortable to work, if they had to put in on. This resulted in most workers suffering injuries that could have been avoided.

- An account of limited health and safety measures in the workplace by those in leadership/management position

It was reported that there was limited measures by those in leadership to ensure that the health and safety of workers is considered. Most manufacturing industries in the

Polokwane municipality did not have policies and regulations on the implementation of health and safety. It was reported that it is difficult to enforce health and safety regulations because they did not exist, which led to most workers becoming negligent or management not doing anything to ensure that work is conducted in a healthy and safe manner.

Workers reported that they were spending most of the time on their own at their respective work stations. This led to some workers acting in an unsafe manner because there was nobody to supervise or discipline them. Another health and safety measure challenge that was reported in the manufacturing industries of Polokwane was insufficient inspection by regulatory bodies. Regulatory bodies include health and safety compliance inspectors who are expected to visit workplaces regularly to ensure that workplaces adhere to health and safety regulations.

Within the psychosocial work environment there were reports that those in leadership were not providing workers with any assistance. Most workers reported that they were overloaded with work due to under-staffing and could not cope with certain tasks at work. Workers reported being scared of reporting such cases due to job insecurity. They reported that they would rather suffer than lose their job. There were reports from workers that those in leadership do not offer them assistance when they encounter personal problems.

The design of the workplace, close relationship with those in management, and how work is organised were reported to cause workers a lot of distress in the manufacturing industries of Polokwane. Most workers indicated that they are pushed to meet certain production targets even though they are unable to. Most workplaces are congested and workers are unable to work freely as they are supposed to twist and turn frequently due to limited space.

7.4.3.2 Summary of themes from supervisors and managers

Findings from supervisors and managers indicated that they are challenges experienced from both workers and management. The findings yielded two themes that focussed on workers and management.

- Workers' conduct and ability to perform tasks are hazardous

Supervisors and managers indicated that they have observed workers in their workplaces conducting themselves in a manner that poses health and safety risks to the entire workplace. Workers were reported to be negligent when they execute their duties, which resulted in injuries ranging from minor to sever.

Workers in some manufacturing industries of the Polokwane municipality were reported to lack safety awareness and most of the time they did not adhere to safety regulations at work. Most of the times workers were reported to be working without protective equipment and to take short cuts when operating certain machines. Adherence to standard operating procedures was reported to be non-existent amongst workers in the manufacturing industries of the Polokwane municipality.

Another challenge faced by supervisors and managers was that workers are do not report accidents or near-misses that occur within their work stations. Workers are reported to be scared of reporting accidents or any incident because they are scared of being and action being taken against them. This makes it impossible for those in leadership to mitigate causes of such accidents or incidents and there is an increased likelihood of accidents or incidents occurring again.

- Lack of commitment by management towards health and safety in the workplace

Supervisors expressed their frustrations regarding the lack of support from management. They reported that it takes time for management to respond to them when they require assistance. Challenges that supervisors experienced and reported are lack of staff, old and under-performing machinery, lack of health and safety training for workers, and adequate communication. It was reported that engagement with the entire workforce is still a challenge and the only thing that management is focused on is production.

Poor work organisation like the working relationship between management and supervisors was reported to be a challenge. Supervisors reported that they were being over-worked by management, which leads to them as supervisors not being available when workers are at their different work stations. Supervisors' absence was reported as one of the causes of workers' negligent conduct.

Supervisors further indicated that lack of psychosocial support by management for the workers affected them mentally, and accounts for some of the accidents. Supervisors were unable to motivate workers to focus on their duties, especially those who work with hazardous materials and machines.

7.4.4 WHO Workplace Framework and Model

The WHO Workplace Framework and Model was consulted to create a working environment is healthy and safe for managers, workers, stakeholders and communities. The framework describes how a workplace should prevent pollution and keep the environment unpolluted. Its focus goes beyond just the workplace but includes any component of the environment (work, home, community and atmosphere) that might be affected by activities emanating from a workplace.

The framework further guides on how a healthy work environment can be developed. The framework suits the conditions that were identified within the manufacturing industries of the Polokwane municipality. The WHO Workplace Framework and Model was chosen for the current study because the four avenues described in the framework and model by WHO address the reported health and safety challenges in the manufacturing industries of the Polokwane municipality, where occupational accidents experienced in 2012- 2014 were not decreasing.

WHO (2006) defined health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”. Based on the definition, the framework describes how health can be achieved through four basic components for a healthy and safe workplace.

The four basic components are the *physical work environment, personal health resources, enterprise community involvement, and the psychosocial work environment*.

The framework requires that all stakeholders in a workplace be involved in designing a workplace that is able to identify and control identified hazards. The developed health and safety training programme for manufacturing industries of the Polokwane municipality was based on the findings of the study, which were guided by the WHO Workplace Framework and Model.

7.4.4.1 Physical work environment

The physical work environment is where work in the workplaces takes place. It is an area where workers spend most of their working hours performing tasks for the employer. It is within this area that there is increased exposure to noise, heat, dust, contact with machines and chemical substances, and bacteria and viruses. All these become hazardous to workers if their exposure limits are exceeded or workers become exposed to them through contact.

Within the physical work environment in the manufacturing industries of the Polokwane municipality, workers were reported to be exposed to hazards such as noise, dust, chemical substances, ergonomic hazards and heat. Poor work organisation and PPE challenges were reported to compromise the health and safety of workers. Data that served as evidence for the study was collected through observations of the study sites and interviews with general workers, supervisors and managers.

7.4.4.2 Psychosocial work environment

The psychosocial work environment describes how work is organised, organisational culture, beliefs and attitudes, communication channels and practices at work. These are psychological attributes and they are associated with working conditions, relationships amongst workers and with management. The way these attributes are addressed at work can affect workers positively or negatively. If they are not properly addressed they affect workers' psychological state and lead to stress and depression.

In the manufacturing industries of the Polokwane municipality, it was found that the working conditions within the psychosocial work environment were not addressed properly. Workers and their supervisors reported that there was a lack of support from management in terms of personal issues, distant management, lack of health and safety policies, lack or no health and safety training, and having to work in congested areas.

7.4.4.3 Personal health resources

According the WHO (2010), personal health resources relate to a supportive work environment, information sharing and availability of health resources for workers. Within the manufacturing industries of the Polokwane municipality, workers reported

that the work environment was not supportive. At times workers are unable to report accidents or near-misses due to fear of victimisation.

7.4.4.4 Enterprise Community Involvement

This avenue focuses on the roles industries should play in ensuring that surrounding areas close to the operations of the industry are healthy and safe. Although this avenue was not investigated during the study, it was found that due to a lack of health and safety training of workers, activities of the manufacturing industries of Polokwane might spill into the surrounding communities due to lack of knowledge of workers. Workers who are not trained on hazard identification and prevention might dispose of some hazardous materials into the streams or landfills within the communities.

7.4.5 Knowles adult learning theory

The theory of Knowles (1984) was used to develop a training programme for the manufacturing industries of the Polokwane municipality. The theory identifies and describes the six characteristics that should be considered when developing a training programme for adult learners. A lot of consideration should be given to the need for training adult learners, the type of information to be included in the training programme, and the mode of content delivery. Knowles (1984) recommended the use of pictures, diagrams and the experiences of the adult learners. Adult learners should also be respected and valued in order for them to feel accepted.

In the manufacturing industries of the Polokwane municipality, it was found that most of the workers were adults who have been working for years in their respective industries, thus this learning theory suited their environment. The training programme developed considered the Knowles (1984) theory because there are a lot of pictures, diagrams and tasks after each lesson to ensure that workers are not only feed too much content, but that they engage with the course material.

The six characteristics that Knowles identified are:

7.4.5.1 Adult learning is autonomous

Knowles (1984) indicates that each adult learner should be recognised as an individual who is willing to learn and their learning needs should be considered. A better way of understanding each adult learner is to ensure that trust is built with them before

designing general goals for training. The training programme that was developed for the manufacturing industries of the Polokwane municipality considers adult learners and before each training session trainers should ensure that they understand the participants' fears and needs.

7.4.5.2 Adult learning utilises knowledge and life experiences

Since most adults have accumulated knowledge and skills at their respective workplace, it is best to link what they know with what they do not know. During training, trainers should ensure that they move from the known to the unknown to accommodate knowledge that the learners have already accumulated. The training programme that was developed uses a question and answer method where learners are offered an opportunity to relate their existing knowledge with new information.

7.4.5.3 Adult learning is goal-oriented

Knowles (1984) further recommends that, when training adults learners, a lot of emphasis should be focused on what the training aims to achieve. Adult learners in the manufacturing industries of the Polokwane municipality would be offered information that would assist them to prevent occupational accidents. The content of the training programme is linked to challenges that were identified during the study.

7.4.5.4 Adult learning is relevancy-oriented

It is vital that new information that is imparted to adult learners should be relevant to what they are doing at work. It was found during the study that most workers in the manufacturing industries of the Polokwane municipality were unable to transfer learnt skills to their workplaces. The training content should not include information that will ultimately not benefit learners. During the development of the training programme it was ensured that all learners learn what is relevant to their workplace and the selection of learners who would be offered the training would be based on that.

7.4.5.5 Adult learning highlights practicality

Knowles (1984) indicates that adults should learn information that can be linked to real work situations. On completion of the training they should be able to apply the knowledge gained to their work. To ensure practicality of the training, the developed training programme has a lot of illustrations and pictures that are linked to their work

environment. Through the use of questions and answers, adult learners will be able to apply the known with the unknown.

7.4.5.6 Adult learning encourages collaboration

For adult learners to feel accepted, they should be involved during training at all times. Learners who feel accepted find it easy to grasp new information and participate during learning. In the training programme, there is an opportunity allocated for adult learners to tell stories and experiences related to their work and how this affected their work, either positively or negatively.

7.4.6 Summary of the training programme

The aim of the study was to develop a training programme to prevent occupational accidents in the manufacturing industries of the Polokwane municipality. The training programme was developed based on the findings of the study using Knowles adult learning theory. SAQA standard units were used as a guide on how to develop a training programme that is of an acceptable standard. The total amount of time that is required to complete the training of workers is 40 hours and the training programme offers 3 credits and is pitched at NQF level 2.

Components of the training programme are:

- √ Motivation for the development of the training programme
- √ Theories that guided the development of the training programme
- √ Valuation of workers
- √ SAQA Unit Standards
- √ Modular content

The health and safety training programme that was developed to prevent occupational accidents in the manufacturing industries of Polokwane is divided into seven modules. Each module in the training programme addresses the identified challenges found in the manufacturing industries of the Polokwane municipality. The findings from the review of health and safety training programmes, observation of the study site, and interviews indicated that there is a need for workers to be trained on crucial aspects, which are included in each module of the programme.

The training programme has the following seven modules:

- Workplace health and safety regulations
- Health and safety in the workplace
- Hazards of machinery in the workplace
- Personal Protective Equipment (PPE)
- Work performed at heights
- Accident/Incident investigation
- Organisational culture

The learning outcomes of the training programme are:

- Recognise and resolve problems using artistic thinking through the theories learnt and tasks offered during training
- Work efficiently with others as a member of a team within their work sections
- Organise and manage oneself and one's activities responsibly and effectively in order to avoid occupational accidents due to negligence
- Utilise technology effectively and critically, showing responsibility to the environment and health of colleagues, visitors and the community
- Exhibit an understanding of the workplace and how work should be done by recognising that handling of occupational hazards is the responsibility of everybody
- Contributing as accountable workers locally by ensuring that their activities in the workplace do not endanger the health and safety of others

The outlined outcomes of the training programme were developed based on the training needs of the workers. The identified themes indicated a need to train workers

on how to recognise and control hazards in the workplace. Most workers in the manufacturing industries of the Polokwane municipality were reported to lack awareness and acted in a negligent manner when executing their duties.

The training programme has an assessment at the end to determine if workers are able to apply learnt information. The assessment tool has three sets of questions that cover knowledge, comprehension and application according to Bloom's Taxonomy.

7.5 LIMITATIONS

Limitations in a study are those influences that a researcher is unable to control due to circumstances arising during the study. The following limitations were encountered during the study.

- During data collection some general workers were too scared to reveal certain information because they feared victimisation.
- In this study, the challenges encountered were defensive managers who portrayed their workplaces as being healthy and safe, which compromised certain information.
- Since the study was qualitative, the findings cannot be generalised to other manufacturing industries.
- Most managers did not participate in the study but sent only their supervisors and thus key information from the perspective of management was missed. The missing information from management could have yielded more themes and added more knowledge that could be vital for the prevention of occupational accidents.

7.6 RECOMMENDATIONS

The WHO Workplace Framework and Model ensures that the working environment for workers, their families, communities and the environment is taken care of. It is

therefore the responsibility of both the management of the manufacturing industries its workers to work together with the surrounding communities for a healthy and safe working environment and communities. Based on the WHO Workplace Framework and Model, the study recommends that management of the manufacturing industries of Polokwane adopt information as detailed below.

7.6.1 Recommendations to workers

According to the OHS Act (85 of 1993), it is the responsibility of each worker to ensure that they act in a healthy and safe manner at work. Workers should ensure that they:

- √ Conduct themselves in a manner that does not put their health and those around them in danger;
- √ Adhere to standard operating procedures as laid down by their supervisors or managers;
- √ Report any accident/incident at work;
- √ Report any unlawful act by their fellow workers;
- √ Communicate any hazardous condition to their supervisors.

7.6.2 Recommendations to management

Based on the WHO Workplace Framework and Model and the findings of the study, recommendations for management are tabled below (Table 7.1).

WHO Workplace Framework and Model : Avenues for a Healthy Workplace	Findings	Recommendations to management of the manufacturing industries of the Polokwane municipality
• The physical work environment	Physical, mechanical and chemical hazards were identified	• Management to develop health and safety policies and involve workers in the development of those policies; • Management to train workers on the utilisation of machinery and other equipment; • Management to provide workers with correct PPE; • Management to ensure that monitoring of the workplace is done frequently.
• Psychosocial work environment and personal health resources	There is lack of investment by management, poor work organisation, lack of psychosocial support by management, and lack of	• Management should ensure that they create a supportive work environment, that there is information sharing and availability of resources; • Workers should be offered training to ensure that they acquire the necessary skills and knowledge;

	material resources for workers' personal safety.	• Management should be closer to workers and avoid being too distant.
• Enterprise Community Involvement	Lack of information regarding how manufacturing industries are involved within communities.	• Management should develop programmes to indicate their working relationship with communities.

Table 7.1 WHO Workplace Framework and Model guidelines for prevention of occupational accidents in the manufacturing industries of the Polokwane municipality

It is also recommended to management of the manufacturing industries in the Polokwane municipality that they introduce incentives for the best performing departments/sections in their industries. This will motivate workers to adhere to safety standards and encourage those who are negligent to start performing their duties in a safe manner.

7.6.3 Recommendations to Government, through the Labour Inspectorate

Inspectors should ensure that they:

- √ Regularly monitor all manufacturing industries frequently and enforce health and safety regulations;
- √ Arrange frequent Provincial workshops/seminars where local and international health and safety experts within each aspect of Occupational Health are invited as presenters/speakers;
- √ Ensure that, as they collaborate with the relevant authorities, when allocating working areas to most black entrepreneurs, enough space is allocated that can accommodate administration, storage of raw materials, a production area, and storage of finished products

7.6.4 Recommendations for future research

For future research it is recommended that:

- √ This type of study be conducted per industry category (food and beverages, bricks production, wood processing);
- √ More studies be conducted amongst black-owned industries that lease buildings to identify their goals/vision and knowledge and views on the importance of health and safety;
- √ More studies be conducted on the roles of labour inspections regarding compliance and enforcement of health and safety in the manufacturing industries.

7.6.5 Contribution of the research to the body of knowledge

This is the first study in the country, the Southern African countries, and one of the few in Africa to focus on manufacturing industries. Management in manufacturing industries and scholars will be able to use the information to increase the health and safety at work and for further research.

The developed health and safety training programme for the manufacturing industries of the Polokwane municipality will assist industries that do not have any training programme to train their workers. The content of the training programme ensures that:

- √ Management understands their role in the workplace and that they start involving other stakeholders when developing health and safety policies and other regulations relating to production at work;
- √ Workers become aware that negligence is a major contributor to occupational accidents;
- √ Supervisors should be able to monitor workers in the workplace frequently and listen to the needs of the workers;
- √ Government will be able to monitor workplaces frequently and ensure adherence to health and safety regulations.

The findings of the study and the developed health and safety programme cover a wide range of activities that should be monitored in the workplace to ensure the health and safety of all is taken into consideration. Most studies were unable to yield such findings.

7.7 FINAL CONCLUSION

The study findings indicate that there are multiple challenges in the manufacturing industries of the Polokwane municipality regarding the prevention of occupational accidents. From observations of the study site, review of health and safety training programmes, and interviews conducted amongst workers, their supervisors and managers, a lot still needs to be done,

which will require a multi-disciplinary approach where each participant should be committed to ensure that the challenges are dealt with.

For industries not to have a health and safety training or an alternative in the form of outsourcing the services, is of huge concern. Without the training of workers, workers will remain unequipped with the necessary knowledge and skills to deal with health and safety in the workplace. Workers will continue to conduct themselves in an unsafe manner and continue to cause accidents in the workplace.

Another challenge reported was management not protecting workers who work at heights. A lot of injuries and deaths were reported in Chapter 2 and 5 due to lack of safety whilst performing work at heights. In some manufacturing industries of the Polokwane municipality there were cases where workers fell from heights due to unavailability of guardrails. Provision of PPE by management poses risks to the manufacturing industries of Polokwane. Management fails to provide workers with appropriate PPE or sometimes incorrect PPE, which indicates that management does not consider the health and safety of their workers. In instances where workers are provided with the correct PPE frequently, they did not use it for reasons that they justified.

Workers were reported to act negligently, which threatened the health and safety of other workers. Although some reported that supervisors are sometimes not available within their work stations, it is the responsibility of each worker to ensure that they act in a way that does not threaten their health and those that are close to them.

The reported lack of health and safety training for workers and under-staffing are the causes of most workers being unable to perform certain duties at work. Most accidents at work are caused by workers who lack knowledge and skills on how operate machines or handle certain hazardous material. Although most workers reported that they have work experience and do not require any health and safety training, this is risky because technology has evolved over the years and work is now done at a very fast pace. All workers should be trained according to the requirements of each section and they should be monitored.

The physical and psychosocial work environments in most manufacturing industries of the Polokwane municipality were found out to be hazardous. Workers within those

work environments were exposed to physical hazards like noise, dust, chemicals, working in congested areas and psychological hazards like stress. Distant management was found to be the cause because they are unable to identify such hazards as they do not collaborate with workers in the industries. The other reason was that managers were defensive and saw the situation in the manufacturing industries as normal and safe for workers. Supervisors and workers reported that it takes time for management to respond to their requests. This lack of assistance from management could lead to occupational stress and poor production by workers.

Finally, the silent role of the regulatory bodies who monitor compliance to health and safety in manufacturing industries is a concern. For compliance inspectors to visit workplaces once a year or sometimes only when there are reported accidents or incidents does not encourage management in the manufacturing industries to comply with health and safety. Unannounced inspections are supposed to be conducted and manufacturing industries that do not comply to OHSA (1993) should be penalised.

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APPENDIX A

University of Limpopo Ethics Clearance Certificate

University of Limpopo
Department of Research Administration and Development
Private Bag X1106, Sovenga, 0727, South Africa
Tel: (015) 268 2212, Fax: (015) 268 2306, Email:noko.monene@ul.ac.za

TURFLOOP RESEARCH ETHICS COMMITTEE CLEARANCE CERTIFICATE

MEETING:	**05 November 2015**
PROJECT NUMBER:	**TREC/213/2015: PG**
PROJECT:	
Title:	A training program to support manufacturing industries to prevent Occupational accidents in the Polokwane Municipality
Researchers:	Mr MP Kekana
Supervisor:	Prof RN Malema
Co-Supervisor:	Prof TM Mothiba
Department:	Nursing Science
School:	Health Care Sciences
Degree:	PhD in Health Sciences

PROF TAB MASHEGO
CHAIRPERSON: TURFLOOP RESEARCH ETHICS COMMITTEE

The Turfloop Research Ethics Committee (TREC) is registered with the National Health Research Ethics Council, Registration Number: **REC-0310111-031**

Note:
i) **Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee.**
ii) **The budget for the research will be considered separately from the protocol.**
PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.

Finding solutions for Africa

APPENDIX B

Department of Health Ethics Clearance Certificate

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH

Enquiries: Latif Shamila Ref:4/2/2

Kekana MP
UNIVERSITY OF LIMPOPO

Greetings,

RE: A training program to support manufacturing industries to prevent Occupational accidents in the Polokwane Municipality

The above matter refers.

1. Permission to conduct the above mentioned study is hereby granted.
2. Kindly be informed that:-
    - Research must be loaded on the NHRD site (http://nhrd.hst.org.za) by the researcher.
    - Further arrangement should be made with the targeted institutions, after consultation with the District Executive Manager.
    - In the course of your study there should be no action that disrupts the services.
    - After completion of the study, it is mandatory that the findings should be submitted to the Department to serve as a resource.
    - The researcher should be prepared to assist in the interpretation and implementation of the study recommendation where possible.
    - The above approval is valid for a 3 year period.
    - If the proposal has been amended, a new approval should be sought from the Department of Health.
    - Kindly note, that the Department can withdraw the approval at any time.

Your cooperation will be highly appreciated.

Head of Department Date 03/05/2016

18 College Street, Polokwane, 0700, Private Bag x9302, POLOLKWANE, 0700
Tel: (015) 293 6000, Fax: (015) 293 6211/20 Website: http/www.limpopo.gov.za

APPENDIX C

Consent Form

(Please read and understand the document before signing)

RESEARCH TITLE

A training program to support manufacturing industries in the Polokwane municipality to prevent occupational accidents

INTRODUCTION

This is an invitation to participate in the study as a volunteer. This is to help you decide if you would like to participate and should there be any questions please feel free to ask the researcher.

THE PURPOSE OF THE STUDY

The purpose of the study is to develop a training program to support manufacturing industries in the Polokwane municipality to prevent occupational accidents

The sample of this study will be workers selected from manufacturing industries in the Polokwane Municipality

Before the study you will need to complete:

- This consent form and
- Short biographical information request

During the study you are free to withdraw from the study without giving a reason, and that participation is voluntary.

The aim of the study is to develop a training program to support manufacturing industries in the Polokwane municipality to prevent occupational accidents

The study will take at least 30 minutes to complete.

HAS THE STUDY RECEIVED ETHICAL APPROVAL

This study will commence upon approval from the Turfloop Research Ethics Committee and other relevant authorities within the area**.**

RIGHTS AS PARTICIPANTS IN THE STUDY

Participation is voluntary and you have a right to refuse participation in the study. Refusal to participate will not in any way influence any future relationships with the school or the interviewer.

ARE THERE ANY RISKS

There are no risks attached.

DISCONTINUATION OF PARTICIPANTS IN THE STUDY

No pressure will be exerted on the participant to consent to participate in the study and the participant may withdraw at any stage without penalization.

ANY FINANCIAL ARRANGEMENTS

There are no financial resources that participants can benefit from the study.

CONFIDENTIALITY

All information provided to the research team will be treated as confidential.

INFORMED CONSENT

I hereby confirm that I have been informed by the investigator, **Kekana MP** about the nature, conduct, benefits and risks of this study. I have also read the above information regarding this study.

I may withdraw my consent as well as my participation in the study and declare that I had sufficient opportunity to ask questions and therefore declare myself prepared to participate in the study.

Participant's Name _____

Participant's signature _____

Date _____

Investigator's name _____

Investigator's signature _____

Date _____

VERBAL PARENTS/GUARDIANS INFORMED CONSENT

(For **Participants** who cannot read or write)

I, **Kekana MP** has read and fully explained to the **Participant** named _____ the information leaflet that indicates the purpose, nature and benefits of the study. The parent/guardian indicated that they understand everything regarding the study.

I hereby certify that I agreed to participate in the study.

Participant's Name _____

Investigator's name _____

Investigator's signature _____Date _____

Witness name _____

Witness signature _____ Date _____

APPENDIX D

Standard Letter Seeking Permission to Collect Data

Box 332

Bendor Park

0713

13 April 2018

The Manager

Manufacturing Industry in the Polokwane Municipality

Polokwane

0700

Greetings

I would like to take this opportunity to indicate that I have completed the analysis of the study that I conducted at your industry in 2016. I have the findings of the study that I would like to present to you together with the training programme that was developed from the findings.

Kindly indicate which date will best suit you for the presentation of the findings; which might take at least an hour or more, for further discussion.

I would like to once again thank you and your industry for affording me the opportunity to conduct the study at your premises.

Kind regards

Kekana MP

Researcher, University of Limpopo

APPENDIX E

Checklist

Characteristics	Industry 1		Industry 2		Industry 3	
	Yes	No	Yes	No	Yes	No
Work at heights						
- Availability of fall protection plan						
- Hazards and risk control measures communicated to workers working at heights						
- Training for workers working at heights						
- Workers carrying heavy objects up and down the stairs						
The use of PPE during shifts						
Working space for workers						
- Enough working space for workers to perform their duties						

APPENDIX F

Letter from the Co-coder

TO WHOM IT MAY CONCERN

19 JULY 2018

RE: Confirmation of independent coding

This letter serves to confirm that we conducted extensive independent coding for Mr M.P. Kekana. Results (transcripts) of his research were analysed. Codes, subthemes and themes were developed.

We then exchanged the themes, subthemes and codes with Mr M.P. Kekana and met to discuss. The discussions involved comparing what had been developed and what he had until we agreed on final themes and subthemes.

Yours sincerely

Linda Shuro

Independent coder

ROUNDSADDLE
11 BOSBOK AVENUE, FAUNA PARK POLOKWANE
TEL: 083 244 3371; EMAIL: lindashuro@gmail.com

APPENDIX G

Letter from the Editor

PROFESSIONAL EDITING SERVICES

EDITING CERTIFICATE

Doctor of Philosophy in Health Sciences

MP KEKANA

THIS IS TO CERTIFY THAT

Prof Kathrine Elizabeth Scholtz has edited the PhD thesis titled:

"A TRAINING PROGRAM TO SUPPORT MANUFACTURING INDUSTRIES TO PREVENT OCCUPATIONAL ACCIDENTS IN THE POLOKWANE MUNICIPALITY"

Prof KE Scholtz

APPENDIX H

2012-2014 Accident Statistics for Manufacturing Industries in the Polokwane Municipality

It has been recorded that during the last half of 2012 a total of 117 (34 fatalities and 83 non fatalities) accidents occurred within the district whereas in 2013 at least 386 accidents were reported. Of the 386 accidents which occurred in different industries 78 were fatal, 288 were not fatal whereas 20 were non-casualties (Department of Labour Report, 2013). Construction with 45 in the last quarter of 2012 and 90 in 2013. Manufacturing industry was the third highest with 33 in the last quarter of 2012 and 59 in 2013. Other industries like agriculture (12 in the last quarter of 2012 and 31 in 2013) and wholesale and retails (8 in the last quarter of 2012 and 28 in 2013) recorded few occupational accidents as compared to the other 3 sectors. Industries with the least number of occupational accidents were transport (4 in the last quarter of 2012 and 6 in 2013) and financial (2 in the last quarter of 2012 and 4 in 2013).

	Last quarter of 2012	2013	2014
Construction	45	90	75
Manufacturing	33	59	60
Agriculture	12	31	30
Transport	4	6	5
Financial	2	4	4

APPENDIX I

Annual Faculty of Health Sciences Research Day Certificate

APPENDIX J

Proof of Voice-Recordings Transciption

ShazzRams
Translation and Transcribing
CK No: 2017/264649/07
Tax Reference No: 9478609184

079 602 2628 | 072 303 1640
shazzshamain@gmail.com

A58 Cabrief Section
Glen Cowie, Limpopo
1085

TO WHOM IT MAY CONCERN

This serves to confirm that **Mr Percy Kekana** was best served with quality services of Transcribing. Twenty-two (22) of his research interviews were transcribed by the above mentioned company during his research data collection.

We therefore take this opportune to extent our humble gratitude and appreciation to **Mr MP Kekana** for having allowed us play some role in his research.

Thank You.

Kind Regards:

MB Makua.

APPENDIX K

Transcript from One Participant during Interviews

Interviewer: Based on the company, what can you say are the common types of hazards that… eh… at this company?

Respondent: Ok, this company we have identified what we call our life-saving rules which are critical areas where people are being… where we say life-saving is in fact fatalities and serious injuries so we've identified that. [moves chair]… Let me just give you an example… [mumbles]… wait… [voices in the background]. Number one is working at heights, number two is mobile equipment because we have mobile equipment moving around the factory, number three is falling and rolling objects because we've got stacking [mumbles] that got stuck in the yard and the material being stacked properly that it may not roll and injure people. Lifting operations, we've got a lot of different… we've got hoist cranes… uh… mobile vehicles with lifting operations, forklifts, mobi-lifts so that's our lifting operations; we've got various like crane in this sections, hoist, chain blocks, lock outs , all our machinery… any work to be done on our anything will be isolated, blocked out and made safe; equipment and safe guarding, any moving machinery needs to be guarded to prevent access to it… you cannot put your finger in there and the V-belts will take the finger off and pulling's on conveyer belts from variables were you could be pulled into it and be injured… like motor vehicles, again we don't allow people to be transferred… transported on unprotected vehicles [sound]… nobody at the back of a vehicle; and hazardous material management. We use certain hazardous material in our operations and we need to identify it, have msds available… material safety data sheets and also make the people aware of the hazards and the first aid measures. So these are our eight life-saving rules, ok… which now… the company has now gone through and looked at all of the injuries… and serious injuries and fatalities of the last 10/15/ 20 years and come up with this and identified that these are the major risks within the group so we focus on these and all of these are non-negotiable and if you are found guilty of breaking one of these life-saving rules you could end up being dismissed because these are for your own safety and to show how serious we are on the issue of saving lives and stopping unnecessary injuries

Interviewer: Based on these eight identified areas, the types of injuries that you've experienced ever since you produced these 8 critical areas

Respondent: Like I said, this is within the industry, it's not… since I've been with the company, nobody in my… to my knowledge has lost their life at working at heights but in the industry, because they've done this throughout the industry, there's other sections of the industry not in the manufacturing so it will be in the… construction itself where they are using our products when installing them, that is where they've also had serious injuries and fatalities at working at heights… uhm… mobile equipment, we've had accidents in the factory… people bumping into stuff, like I said, it's not… nobody's lost their life but again within the industry we've got safety flash this morning, there was a fatality within the construction industry where somebody was ridden over, the front loader reversed and it reversed over somebody so we got the flash this morning. Falling and rolling objects… we get a lot of… the incidents of fall and rolling objects but luckily like I said it's near-misses, it's where the pipe has rolled, or something that stacked was not chopped [not sure about the word] properly, it has rolled and fortunately… it's been minor injuries, it hasn't been major. On the one… on mobile equipment, I can tell you, it was before my time but I am aware of the incident were a certain person had a serious fracture to their leg due to mobile equipment… it was… he was sitting in a certain area and people were moving the mobile equipment not aware that he is sitting there and they actually drove over his feet and his legs so he had a very serious fracture there… uhm… so that's our mobile equipment, lock-outs and isolation are known in any industry… you get serious injuries from not isolating machines.. Any moving machine really can start at any time we know electrical things get… it's got a relay, relay can go faulty, emergency stop button can be faulty, if you want to push it… yesterday the emergency system worked, today you push it, it doesn't stop the machine so emergency stop and stuff like that is not a… effective while you're off, locking up. You need to isolate the power completely by switching it off and applying a lock that under no circumstances that machine can start up while you're busy working on it… uhm… equipment and safe-guarding, same thing… injuries were a pully is not guarded, conveyer belt, tell pully, head pully… any area that is not protected, there is risk and I'm referring back to my experience now, in the mining industry, there also, especially when on that… of how many people were pulled into conveyer belts, especially conveyer belts. It's not a higher risk act, we do have

conveyer belts… we do have conveyer belts, but they're not as high risk as there in the mine; speed is much slower but a conveyer belt is a conveyer belt, it still moves… it still… the tell pully, head pully… needs to be guarded that if you lose your balance and fall into there, not matter how slow a conveyer belt is, you get pulled into that pully, you gonna lose an arm, you gonna lose a life if your head goes through. It's critical that you need to safe-guard all your moving machinery. Like motor vehicles, no incidents here on site that I'm aware of related to motor vehicles; just on the rule itself we did dismiss our previous Safety Coordinator for violating that very rule of transporting people on the back of an open bakkie to show how serious we are on safety and the safety of our co-workers because if they're sitting on unprotected vehicle at the back, not that anything happened, but if he does travel out here and has to put on breaks quickly to avoid hitting another car over there, those people will fly off the vehicle and you end up injuring your colleagues or co-workers. Hazardous material management… also we have had no poisonings here, we've had no serious loss of life or anything by poisoning; it's just as a safety hazard, we've picked it up as hazardous material… we need to have them in a safe place to prevent anything happening on it

Interviewer: What type of hazardous material do you use for production?

Respondent: We're using what we call mould release oils, okay, anything basically is a hazardous material. Tin of paint is a hazardous material, thinners is a hazardous material, glue, a diesel is a hazardous material so each and everything we use on our site, we have a material safety data sheet which tells you what are the dangers of it, what to do in a case of poisoning, it tells you if you've taken it by mouth, this is the first aid measures; if it's come in contact with your skin or into your skin, this is the measure; if it comes into your eyes, this are the measures because you need to know something's… for example, I will tell, if you have ingested glue, I will tell you the right thing to do is to induce vomiting, okay, is to put a finger on your throat and you throw up. On other things, for example, mould release oil, they will say to you do not induce vomiting because it's gonna have a secondary affect; once it's gone down, it's already done damage, it's burnt your oesophagus and burnt your stomach, if you going to induce vomiting, you going to bring it up again and it's now going to make it even worse… so it tells you exactly how to handle each and every hazardous chemical. So

its mould release oil we use here, hydraulic oils, gearbox oils, cleaning agents, degreasing fluid, paints, thinners

Interviewer: And then in terms of storage,

Respondent: We've got a…

Interviewer: ... how do you…

Respondent: … hazard chemical store, okay. It is worked out; each and every item stored there will have its MSDS in a file, okay… so nothing is allowed to be stored there without the MSDS. It must be abandoned area, the storage capacity must be written down to identify what is the maximum amount of tins, drums… whatever your volume of your abandoned area. A worst case scenario, we've got seven drums of moult release oil and all seven drums explode or leak, if all seven drums of 210L leak, it should not overflow the abandoned wall that we end up with contamination of ground water through sippage into the soil… so it's a abandoned area, so you're only allowed to keep that amount of… that quantity of material in that storage area

Interviewer: And who does risk assessment for, for the whole workforce?

Respondent: For risk assessments… look, we've… we've got a baseline risk assessment which was done by head office, the Safety Manager and the Business Unit manager. We do not have any Safety Coordinators or Safety Officers on site… we've… that post was made redundant; those functions are being shared between myself and the Maintenance Foreman and the Business Unit Manager. So the baseline was done the head office and the Manager, and then… a mini hirer… so it's your... as a identification risk assessment. So we need to do that on any non-routine tasks, so if we've got a routine task, I mean the person is doing it every day, okay… we're not actually doing a risk assessment on them every time, what we do is we do PTOs, okay… Plan Task Observations, now… when you do your Plan Task Observations, you work according to the standard operating procedure for that specific task. You're doing your PTO for two reasons, to check for compliance number one, okay… and checking for competency number two. If you're checking for competency, you tell the person you are going to do the PTO on them, so it's a planned task observation to say John, I'm going to do a planned task observation on you on mixing

the moult release oil so naturally, if I'm telling him I'm going to observe him, he's going to do it right so what I'm checking there is his competency because he's gonna do it the way he thinks, well, the way he should… is been taught. If I do not tell him, then I'm doing an unplanned task observation so I'll just stand back and don't tell him that I'm gonna observe him, now I'm checking for his compliance because I know he's been trained and has been found competent so if it's got step 1, 2, 3, 4, 5; then I'll be observing him and if he's feeling a little bit lazy today and he wants to take a shortcut so he's gonna do 1, 2, 4, 5 and he's gonna miss step 3 so we doing a PTO to check for compliance and for competency on the specific jobs. Each job… each task within our files there, we've got a risk assessment for the task; they've all been trained on all those risk assessments on the specific tasks. Can I show you an example… we go now to a … [Sounds]… [Mumbles]… this is eh Operation training manual, were we will train the person. This integrated profile, telling you what is a Grid welder… Polokwane; what sections is…his line of responsibility… is reporting directly to the Supervisor… standard work instructions. This is telling him how to do his job correctly so he's trained on how to set up the machine… okay, also setting up the machine; this is the forms that he's been given that he can check on and here is the risk assessment for the Polokwane RS pipes area, the Grind welder and the Secondary welder, so he's trained on this risk assessment to show him where are his hazards and what are his control measures that he needs to put in place. So each person has been trained on the risks involved on his section on this risk assessment; this is all being done… so that is why we say follow the routine task. They don't do risk assessment every day; it's only for the non-routine. So we know that this grid operator does this job day-in and day-out, Monday to… even work on Saturdays and Sundays to catch up… so is doing the same routine, thing every day… so knows what the risks are but if I take this man and I say to him, ok, tomorrow you are not going to operate the grid machine, I want you to go and stack those pipes there at the back; he hasn't been trained in risks involved in stacking of the pipes so then we need to take him, and go through the risk assessment of stacking and storage of pipes and we will go through that so that's why we say we do risk assessments on none-routine work. Routine daily tasks… we don't do risk assessments, we put the PTO in place to check if you're working according to the risk assessment… if he's identifying the hazards there and what he's doing about it

Interviewer: Ok. And then they've got training, once they go into the field and let's say for that particular day you are not assessing them. Do they have that information to say, I can identify some risks, I can identify some hazards and then I know how to control them… they know how to control… if they identify those hazards themselves during working hours?

Respondent: What we've got is we've got a document were we've now… I've tried to train the people, I've got a lot of experience from the mining industry from 1984 so I take the people and I give them examples because I walk into the factory and I say look we need people to report your unsafe conditions in the factory, not for me, not for the managers, not for the head office… for yourself. You are at risk in a factory yourself; you're walking passed an unsafe condition every day but… it's a fact… it's… with my experience, it's definitely a fact; it's what we call factory blindness. You walk passed the same thing every day and you won't see the danger but let a new set of eyes come in, let us get a visitor from Johannesburg or Dulspruit or wherever. They walk into the factory, they will see something that we've been seeing every day here but we haven't see it as a risk because it's factory blindness, you can come in every day, you see it and you go, you see it and you go and nobody is being injured or it hasn't been identified and this is called factory blindness… you go passed it. What I refer to it also is where I would say factory blindness is on the roads, the speed limit; if you're driving the same road every single day and you know that this section from Polokwane to Chuenespoort is 60 km/h, you drive it every day, you drive from here to Lebowakgomo or to Atok or to… what's the other place the other side to Atok? Burgersfort… If I travel that road every day, I know that the speed limit is 60, if tomorrow they put up a sign there and say 'speed limit is 40', or 'speed limit is 80', nobody is gonna see it… nobody is gonna see it because they know, they've travelled that road from 2002 to 2016 and the speed limit is 60. If they put up a board there 80 or 40, nobody is gonna see it but if a new person is driving on that road for the first time, comes from Messina is going that way he will see that sign of 40 because is not something new to him… I mean is not something that he's driven passes every day; he will see the sign and he will obey it but I whose been travelling there every day, they'll see the sign, 40 but it won't register to me that that sign is now 40 and it used to be 60 because I know the speed limit is 60. So that is what I say when you get factory blindness, you're so used to being something every day in the factory

Interviewer: Ok. According to the life-saving rules as you have identified, do you hire your workers according to age and experience or according to qualifications? Because there are almost risks all of them

Respondent: There is no… since I've joined the company there is no minimum qualification that is required, age is not a factor… of course I'm not gonna go and employ someone that's 80 years old and can't see, and can't hear because he's a risk to himself and to everybody else because he can't hear properly, he can't see properly… it's not that we are discriminating against the old… old people but I mean he's had his time, he's older pensioner, we've got people here who've gone on pension and come back… I mean on fixed terms stuff like that but to answer your question, no. There is no age limit, well, we don't say we want people here between 20 and 30, and… we don't discriminate; as long as a man is… because look, before any man can come work here, he must go for the pre-entry medical so there he's checked, his eye-sight is checked, his health is checked, his high blood pressure is checked, lung function is checked so he must pass entry medical. If he doesn't pass entry medical, he doesn't come here. So if maybe a man is 55 years of age, he's got 5 or 8 years before pension, I'm not gonna discriminate, if he's fit to perform the duty, he comes in and does it

Interviewer: And after performing training like per section, this one is a Welder, this one is a Boiler and all those things… this one is a Mixer. How often do you do some refresher courses?

Respondent: Once a person is trained, they are assessed, once they are assessed, they will be given a… they will be found competent, there is the management assessment, they do a self-assessment and a management assessment and once they are declared competent, they are issued with a competency certificate which explains that this man has successfully completed this training on Grade Operator Welder. This… refresher training, we do not go through the integrated job profile but what we do on the safety side is X-leave every year. We all… the factory shuts down certain period and we come back in January; no work is done in this factory until everybody has done X-leave induction. An X-leave induction we go through our standard operating procedures, standard work instructions, and safe operating procedures for machinery so we do an X-leave induction so that is seen as our

refresher, we don't take individuals and we go through all those training again but then on the safety side, we go through the risk assessment again… risk assessment… go through live-saving rules; we've got a safety program that we do… that we follow X-leave which all the points do we follow.

Interviewer: And then machinery, how often do you service it?

Respondent: We have got a planned maintenance system which is run through head office where they will identify machinery, they will give us schedules so some machinery, depending on how often it's used, number of hours that is being used different parts of the machine so for example, they would have identified now V belt on a pump, on a low tank on a machine; V belt could last six weeks, eight weeks or so or two months so they will have a schedule for every two months to check the V belt on the same unit, there could be a bearing that could last for about five years if the bearing is greased regularly there will not be a failure on it so your schedule will be for every two months to replace the V belt and every six months, eight months or yearly you'll open up the bearing and visually check it… because it's a sealed unit then we will also say you will have a monthly on greasing of that bearing so we've got a planned schedule which is there to try and prevent your break downs but in any industry, you have break downs and you continue to have break downs because… it's horrible to say even new born babies can die, even brand television coming from the factory, it's got all new parts in it, it can blow… resistor can blow, the power can fail, it can have a faulty in the system so nothing is full proof but we've got a planned maintenance system were we try to prevent break downs on and plan stoppages

Interviewer: And have you ever had a day where there was a total shut down maybe because there was an injury or whether there was an accident or something that was related to health and safety?

Respondent: Not in this industry, no… not since I've been here but in mining, yes but not here

Interviewer: And up to now, what is it that you've identified as some serious challenges when it comes to health and safety?

Respondent: Serious challenges in health and safety is …. non-compliance of safety rules and regulations of the workers themselves… taking shortcuts

Interviewer: If they are found not to be wearing PPE, what is it that you do?

Respondent: Disciplinary action. We first start with counselling which we call a reprimand, we call the person in you talk to him, you say listen my friend, what you are doing is not right… he's not wearing any protection so at the end of the day you're gonna be the person who cannot listen to your grandchildren when they want to talk to you but it is our responsibility as your Supervisors and Foreman to ensure you work safely so may we please get it to your attention that not wearing your personal protective equipment is a disciplinary… you can be disciple for it so we give him a written warning that is called a reprimand… we reprimand him and there we also see discipline… we discipline, not as a beating tool which 99% of the workforce see it as a beating tool but I wish they would wake up and realise that discipline is there to correct behaviour. That's why you discipline your children… if your child is picking up the ashtray, you hit him on the hand and say you leave it; you are teaching the child, you are not wanting to punish the child, you are teaching the child… you are teaching them that… I always use that analogy to… when I discuss it with my workforce here, I say the child picks up the ashtray and you say to this child 'John, leave the ashtray' and then you just leave it and tomorrow the child takes the ashtray again, you say 'John, leave the ashtray', child does nothing, you leave that child. Four days later, the child picks up the ashtray, he drops it… he drops it, there's big glass, the child stands on it, he cuts his whole foot… open up the bottom. Now you get up now you… the child has been injured… you get up, you grab the child, you [makes clap sound]… I told you [makes clap sound]… to leave the ashtray [makes clap sound]… what are you doing with the ashtray? [Mumbles] so now, what you are doing is, the child is confused, 'what have I done wrong?' because when I touched the ashtray the first time, my father said leave the ashtray, second time, leave the ashtray, third time, leave the ashtray… now the ashtray breaks, 'what have I done wrong?'. Same with the workforce… first time, you correcting the man's behaviour, so you tell him that what you are doing is wrong, if you continue doing it, I'm going to discipline you. So discipline is a tool to correct behaviour, it's not a punishment

Interviewer: Do you have a wellness program like for employees who are having psychological or social problems?

Respondent: I personally… I cannot tell you that I'm aware of one at the moment. I know when I arrived in the group previous few years back, there was a wellness program which was through that company, I'm not gonna mention the name… in the meantime, we have been sold out, we're under new management and there I have not seen anything displayed anywhere about a wellness program but I'm sure there is… I'm sure there is, and my Manager should be able to give us more details

Interviewer: And then in terms of management itself, are they giving you support in terms of health and safety?

Respondent: Yes, very, very big support. The main drivers in this factory, like I said when… we did have a Safety Coordinator, the position is done away with during this transformation when this company was taken over… when we were taken over by the new company… decision was made from head office to do away with that position and that function will be split between the position of Managers, the Production Foreman and the Maintenance Foreman… so we're the main drivers of the safety program in the factory, myself and the Manager and the Maintenance Foreman with the use of our Safety Representatives

Interviewer: Ok, thanks very much for your time and I hope the information will assist us

General worker

Interviewer: Can you please explain to me the injuries that you have seen here at work

Respondent: Here at work… here at work the injuries that I have seen, a person was caught up in a roller machine. A roller machine is a machine we use to paint these things for circles so when they were painting they were pushing it with their hands and then the roller clipped his finger, when it caught their finger, it turned the whole hand to the side

Interviewer: And usually, how was he supposed to… what was he supposed to do there?

Respondent: There that person was not trained for using that machine at that time… for painting steel

Interviewer: They took him from another section to come and work there that day?

Respondent: Yah… he was… he… we are people who working with maintenance, when you work in maintenance, you need to be workshopped… you need to know the entire workshop… what is dangerous and what is not dangerous so sometimes you may find that you know what is dangerous but if you have not worked with it, you don't know its dangers

Interviewer: So it means he did not know its dangers, how the machine works?

Respondent: Yes, actually he just saw people using it but he had never used it… used it; he wanted to practise using that machine, how it works. That is the problem I think he had. He was supposed to ask someone who is qualified for working with that machine to paint that steel for him

Interviewer: But he got permission from the Supervisor from that section or he just came and started working?

Respondent: I can't say he got the permission from the Supervisor because when there is a workshop, there are inductions that they give you regarding accidents, how accidents happen if you are not careful

Interviewer: So it was his fault that he was not careful. At the time he was working there, the Supervisor was not there?

Respondent: The Supervisor was not there because when the Supervisor comes, he gives us the job card… he is in the office most of the time, unless I got the job card as a maintenance worker, and the time is moving but the production is not moving, that's when he comes to want to know why this and that are not moving. The time the person got injured, the Supervisor was not at the workshop

Interviewer: So that means they only come when the production is not moving, if the production is moving, then you just continue working alone?

Respondent: Yes, we just continue working alone because they are always… they might come to the workshop to look for something… job cards, when you are done working, job card to sign it off… such things but every morning we have a safety box. That is why I was surprised as to how did that person get injured at the workshop

Interviewer: Besides the incident of the person who was trapped by a machine, what other accidents have seen happening?

Respondent: Some of the accidents that I usually see… we use grinders, there is a grinder, and they call it a bench grinder… yah… So it also, it's wheel its big, if you don't tighten it, it can unscrew and cut the hand or hit you and kills you

Interviewer: Is there anyone who was ever injured by it while you were busy working or is it just that it's one of the accidents?

Respondent: That one we normally see it on the safety tool box when they report to us that someone got injured somewhere… someone got injured somewhere… so it's the same thing as seeing it with my eyes because it's what we use

Interviewer: But there was no one who has ever got injured by it… bench grinder?

Respondent: No, were we are working now, no one has ever got injured by it

Interviewer: Which places do you think that are too dangerous to you here where you are working?

Respondent: Because there are mobile cranes, mobile machines in the yard… sometime their reverse wall fail… you try to reverse and it beeps [makes beeping sound]… because there is always noise here, some machines are different, there are others used for cutting wires and they make a lot of noise so maybe a forklift might hit me while reversing unintentionally or maybe the TLB might be reversing, you are passing and other machines are making noise and it hits you; in other words, every time you are walking around you need to be aware that this and this is happening here

Interviewer: And this places…

Respondent: … and then…

Interviewer: Ok, continue

Respondent: And then some places that are at [word], there are rails inside and other trollies which are moving inside the track rail and stuff. You might be looking at the trolley, and a rail traps you and you fall to the ground and when you fall to the ground you find that the trolley passing there might hit you so it's a very dangerous place and it's not barricaded and stuff

Interviewer: What moves the trolley?

Respondent: It's moved by a person, when that person is moving that trolley, it means that it's carrying pipes, there are these other pipes for… so those pipes have a tendency of rolling, you find that when he is operating that trolley, because it does not have a steering, it just moves on the rail… when he is walking, he is focused on the pipes so that they don't fall because that rail has bumps

Interviewer: Oh… So where people walk and where the rail is, they did not create protective measures?

Respondent: Yah… there are not protective measure in that when a trolley is passing you could… there are stairs and you pass above and know that there you are safe, and there are some areas which have stairs when you go on top to the mixer… you could come down, trap and fall and get hurt and it's on top at the mixer

Interviewer: Where the stairs end, did they not put in bearers?

Respondent: The only places which has bearers are platforms so that means when you climb up… sometimes when you climb that wall… and you just don't tie yourself with a belt even on the staircase unless if they are going up… so you could be coming down, get disturbed and the ground is too far

Interviewer: Is it not possible that whatever you will be carrying may be lifted up using a crane without a person carrying them up?

Respondent: It's not too high cause it could be 2m, and 2m is not far… it should at least be 500m and above so that you don't fall and get injured… that's the danger there. And there are cages as well, they are also going up there… you could be passing by the barricades and they could trap you. There is something that we call a [word], it could also trap you. When you pass there you need to check how the process is going… it is able to take a mix there and take it up. You might be walking passed

the platform plus they are walkways but it can catch you if you are not aware if you are walking around holding them like this

Interviewer: So where you walk and where the mixers pass, it there no distance in between where you walk on foot and where the cranes are when they will be lifting things to the top?

Respondent: The space that there is called hand-rails that you hold on to as you are passing by so the crane… crane works… it carries heavy things so those ones there sometimes they are light but it can trap you cause it happens most of the time

Interviewer: I meant to say, the crane itself… it carries things from the ground to the top…

Respondent: Hmm…

Interviewer: … the distance from where you will be climbing with those handrails or the staircase… it has handrails, right?

Respondent: Hmm…

Interviewer: … and where the crane is, is it too close to the stairs in that it could hurt someone?

Respondent: What they call a skip used for going up and down, it's next to the handrails. It means when you are passing there going to [mumbles]… the soil is going somewhere. The person who is operating that machine has to cross there or maybe the machine has a brake down and must cross there

Interviewer: Is there a day where there was a shutdown due to a major accident that happened, maybe for a couple of hours or the whole day because maybe an employee got injured or maybe another accident happened?

Respondent: Because here I have 2 year… 2 years back I was working for another company somewhere around Polokwane that is where… a front loader was making a turn, reversing because it was at a steep-slop area so it meant that it was putting in the aggregates into a skip so when you reverse, that person did not see it because that is where they were blasting… where there was a lot of noise so it reversed and drove over him and he passed away… we took almost 2 weeks without working

Interviewer: And then do they give you PPE here at work?

Respondent: PPE, they do give it to us here at work

Interviewer: Does it go with the sections of the workers or PPE just because it's PPE?

Respondent: They give us according to specific tasks that we do

Interviewer: How many times do they give it to you? How many times do they change it?

Respondent: Let's say we who work in maintenance, they give us about 6 overalls for twelve months, and safety boots we can get 4 for twelve months… eh… 2 pairs in twelve months. And things like gloves, we have a storeroom where in you are able to go to the storeroom when your gloves are worn out and they give you another pair or noise [word] are worn out, you can go ask from the storeroom… if you feel that your nose respirator is letting in dust, you are able to go to the storeroom and they change and give you another one… and then , even the goggles during dusty times, if you don't feel comfortable with them, you can go to the storeroom and show them and they will give you another pair… and replace… replace

Interviewer: Do the workers wear them according to the way they are supposed when they are busy with their work?

Respondent: Yah… the workers do wear them when they are busy with their work but mostly they wear gloves, aprons for those who are working with things that could damage their overalls… so the most that I see not wearing them are those from noise respiratory because sometimes you cannot see the dust with your eyes… they like to wear it when there is a lot of dust but normally its things that we have to always wear so some have told themselves that dust since you cannot see dust with your eyes, then there is no dust… I think it's one of the other things which damage all of us as worker

Interviewer: If a person for instance did not wear that mask or gloves or goggles or boots, are there steps that management or the Supervisor takes?

Respondent: Yes, there are steps that they take cause there is where we call dust area, that is where you are forced to wear those things when you are going there but

somewhere where it's far from where the dust is and… immediately when you enter the yard you need to wear a dust mask according to the law but when you are next to the offices, you can walk without wearing those things… and the dust can be controlled… sometimes when it has rained, there is no dust unless if there is something faulty that forces us to close… such things. So the dust that is where there are no pavements like where they dip the sand and concrete stones

Interviewer: But if maybe it's a section that maybe you are supposed to wear goggles, and maybe hardhat and boots, one of the employees or the employees did not wear them, what steps have mostly been taken if they are there?

Respondent: If an employee has not worn safety, even me as an employee I can remind him that you are not properly dressed, you did not put on a hardhat, you are not wearing hand gloves and the work you are doing requires hand gloves and stuff. So if I'm telling him and doesn't listen to me… every section has a Supervisor or a Safety Rep, they are co-workers because sometimes when you go to the Supervisor it's like you are not following the company procedure so that means I have to tell the Safety Rep and tell him to talk to so and so, I think they did not put in… a hardhat or gloves are missing on him

Interviewer: The people… employees who have problems maybe at home; it could be either be financial problems or… there are many problems which emanate from home… and they are coming to work. How does management help you with those problems which… a person even psychologically is not well but forces to come to work. How do they help you with that?

Respondent: Pertaining to problems from home… eh… the management… I'm not sure about that because I haven't had problems or heard anyone saying that they have problems at home. Those who have problems usually they would be referring to what happened the previous day to say that yesterday I wasn't at work because I had problems at home. What the management does is to give us 12 days in a year to say if you have family problems, you can take 1 day off every month

Interviewer: In other words you don't have psychologists that they would sometimes send you to them or social workers or anything?

Respondent: No… the management until now they haven't had… I'm still not sure if they have them because I haven't seen a person, let's say… cause at the gate when we get in every morning they test our alcohol. If maybe a person is stopped at the gate 2-3 times because of alcohol, I haven't seen management talk about psychologist where they would take a person to rehab and such things. Let's say that person is late every Monday and when they check they find that it's alcohol, maybe he has alcohol problems, I haven't seen… heard management talking about such

Interviewer: If maybe…

Respondent: … to help a bit and figure out what is their problem because some you see when a person is coming late to work that it's either he has a family related problem cause it was the weekend, let's say cause many people come on Monday

Interviewer: But there is no way that there are measures which are taken?

Respondent: Measures that taken…

Interviewer: … to try to help the employee. Let me just say maybe over and over again every time when you enter there and they are checking for alcohol, he always has it in his body. Is there any way that you've heard that management has taken that person somewhere to try and find out what is their problem of drinking alcohol?

Respondent: No, I haven't heard management talking about that, what I've had them talk about is just take you to disciplinary hearing, maybe that's where a person can bring forth their problems

Interviewer: From that disciplinary hearing, you don't know if whether they help him to get out of that problem?

Respondent: No, I haven't heard him coming back from the disciplinary hearing saying that management was assisting me with the problem of… quitting alcohol, no

Interviewer: Let's look at what we call risk assessment, to investigate risks at work.is there someone who has been appointed to check all the sections, to check for hazards the sections and how they could cause accidents?

Respondent: Hmm… the person who always does rounds…

Interviewer: It could be from management or someone who was hired, who often checks all the sections; it could from welding or maybe production or maybe from maintenance… who comes to check what could be the problem in welding, the problem is this in here and in there the problem is this so that they can know how to fix the problem. Is there such a person who checks for those things?

Respondent: Yah… the person who checks for those things is there so it means every month there are safety meetings… Safety Rep meetings where the Supervisor, Production Foreman and the Maintenance Foreman they have a safety meeting that means that every day, the Safety Reps… every section has a Safety Rep who know that a hazard is like this and this… it could be like this and this. So that means that every month have to sign [word], every day we have to receive approximately 2-3 [word] and they want every section to have 10 [word]; which means that we are able to report a hazard before it causes an accident, we work together with the management and there is a Safety Rep from head office who comes here every month to check if the whole Plant… how many [word] did we get and then do a follow up check to want to know what action did we take after getting those [word]… I think it helps us most of the time to avoid having major accidents where I'm working at now

Respondent: Those [word], if you were able to see them or even it was not [word], there was an accident, someone got injured maybe a machine injured them or something while busy working. Who takes… whose responsibility is it to see to it that these [word], they try to control them even in future so that it does not be a hazard anymore or the injuries which had happened? So that people are no longer at risk of getting hurt. Who is in charge, checks and then… that these things… then… we know we have this problem and we fix it

Respondent: Management is the one in charge, those [word] we report, every month, let's say the Production Foreman together with the… the Production Foreman and the Maintenance Foreman, they go to the Plant, the whole Plant to see if what the [word] has stated that is hazardous, what measures did we take after noting it down

Interviewer: Yah… does management give you support when it comes to safety issues?

Respondent: Yah… management doe give us their support when it comes to safety

Interviewer: What kind of support?

Respondent: Support in supplying us with PPE, I could say it's the first thing and with encouraging us that we need to have a safety meeting every day before we go to the Plant, and getting a report from… it seems the company has… we get a report every day to say that someone was injured somewhere… a person… yah… you find that maybe the person is dead, it's what you find that gives us strength at the company until now at this factory that I'm at

Interviewer: Do they come and sit with you or they just send messages only?

Respondent: When the Manager gets a report from other companies, he prints out… even pictures of the accident that happened and then they come through the Maintenance Foreman who then gives them to the Supervisor and then the whole maintenance team sit down to have a workshop and then we… they explain to us as to what happened where-where and stuff. And then let's say next week we also draft our safety meeting to discuss something of that nature so that we can remember

Interviewer: Often times, there are Inspectors from the Department of Labour. How many times do they come here to check if everything is alright?

Respondent: People from Department of Labour… eh… I'm sure that between now and January, I only saw them once. I'm not sure if whether they come once quarterly or what… maybe I can say that they come 4 times a year

Interviewer: Oho… and according to you, as you look at this company, what do you think needs to be fixed, things which could end up causing problems? Causing injuries in particular or accidents… looking at the company as a whole, which things do you think the company need to focus on which can cause problems

Respondent: What they need to be careful of which can cause problems?

Interviewer: Yes, it could be an accident or just a minor injury on the workers

Respondent: According to me, what I think the company can do every now and then is to print out sign boards to indicate that this area is dangerous, safety… to indicate that this is the type of PPE that you need to wear in this area. If they say there are slow moving machinery… ear plugs, you need to wear them so that you can follow the

sign board and know that it is dangerous here and there. That's what I think that the company should always follow… so… yes

Interviewer: So… for now you don't have sign boards in the Plant?

Respondent: We do have sign boards in the Plant, they are just short here and there. All danger sites have sign boards

Interviewer: But some areas to indicate that maybe there is moving machinery or maybe its chemicals. Are there ones showing or employees just know that I need to always be careful when I go there because a machine might come at any time; a crane might come or there could be something that could cause an accident. Are they there or do you think that management needs to…

Respondent: They are there I'm just concerned about a person who comes to visit and maybe they haven't been inducted because there are crane which move up there, that is why we wear hardhats; where they are loading, they… yes. So they are there, for use the employees, because everyone knows their section, you are not allowed to go to a section that you are not working in… you know that your section… you work in this type of place and their sign boards are like this and that. Going to another section becomes a problem and brings the question of 'what were you going to do there?' but even the sign boards, you see them during the induction because during the induction, they are able to show you the whole factory and you know that you work in this type of section… let's say the sign boards indicating the escaping road, if there is an accident, when you escape, go to that direction are there for a new person

Interviewer: In general, how do you see your health and safety here? For the employees at the company

Respondent: Employees' health and safety for me… for now I could rate it 70 out of a 100; it's not yet 100%, especially health

Interviewer: Can you explain what you mean?

Respondent: Eh… health… I could say that were we are working there is a lot of dust so they have to maybe let's say every month, there should be people from Health who come to test us to see how our lung system is functioning because some of us we do smoke sometimes, when dust is added there… you encounter it from the gate cause

when you enter you come across lorries driving away and there is dust, maybe cements on their tyres so immediately when it brakes, it's a [word] brake and then there is a lot of dust from the tyres of these big cement trucks because they are all far, when each one stops cause there is [word]… they don't pour water… that is what I think does a lot of damage to us until now

Interviewer: Safety, according to you the management… where are they with regard to safety? In percentages maybe

Respondent: Management out of 100 I can say… let's say 70 because they are also working like us

Interviewer: You mean they are still lacking somewhere…

Respondent: They are still lacking a lot

Interviewer: Can you explain a bit, where there is lack in terms of safety to say what could it be?

Respondent: They need to… maybe a person every month… they need to know a person's problem, let's say maybe that person has a lung problem or they have a medical that they collect every month, such things… it's not things that they put in the file and know that a person up to so far can… with their illness they can… to… can be cured and such things. So if you get sick while you are work, you are sick because sometimes even when medical aids… but we don't have them… when you are sick, you are sick, there is nothing you can do… you just have to take money from your own pocket

Interviewer: Are you obliged to come to work when you are sick?

Respondent: When you are sick you are not forced to come to work, as long as you have a doctor's letter, they don't have a problem. They have a problem when you don't have a doctor's letter cause they say that they are not sure if you were sick or not. Let's say they know your state of health, safety people… people from Health came to check us and mentioned that this person has this kind of illness, if it disturbs you from coming to work, you wake the following day to say I was disturbed by this kind of illness, they say it's over; they won't take it even though they know your health status

Interviewer: Are there employees who are working even though they have other illnesses but they continue with their work?

Respondent: Yes, they are there… I'm sure.

Interviewer: Have they never, due to their illness, end up having accidents where they are working because they are ill but forced to come to work and now they have to mix, use the crane, use… or drive. Has there ever been anyone who had an accident that was caused by their illness?

Respondent: The ones that I know have never had an accident; you just see their activeness and see that they are not that active to show that they are thinking about something else because the things that we use have a process, if a certain process stops; it stops the whole Plant to operate… you can see that I don't know this person to be like this but what's happening with them today but because you know them, you are able to see that that illness they have is disturbing them… let's say a person with a lung problem, you just hear them coughing but where they are working they are supposed to work fast

Interviewer: Let me take this opportunity to thank you for taking your time to participate

Respondent: Ok, I am also grateful

Management

Interviewer: Can you explain to me the types of accidents that you experienced since you've been here?

Respondent: Not me personally because I haven't experienced anything but… from what… isn't that an inside info?

Interviewer: What is…

Respondent: Isn't it confidential if there are accidents that actually occurred here? Or I mean…

Interviewer: Just to explain the types of accidents and not the place

Respondent: Ok. That would… ok, let me think… but most it's from handling heavy stuff… yah. It's from lifting equipment… you know… you lift and you find that the chain

is not… it hasn't been inspected well and then it drops and then you hurt yourself or even though you haven't lifted it too high, and it drops… and those are like… yah… those are kind of incidents that happen but we haven't really had accidents much… I mean… we… yah… we… we haven't experienced much and I have a year of working so

Interviewer: And in terms of injuries?

Respondent: That's part of it… when you lift something… yah, we had such sometime… you know, you lift and then it drops and then it hurts something

Interviewer: And then hazards that are associated with the type of work that is done?

Respondent: Just maintenance, it's only a maintenance site… yah… just only maintenance site because you will be fixing something you know… like… you will be fixing or doing work on the jaw because we use crushers… you know… and then you lifting on that time and then… it's kind of… the… the… the chain snaps and then you find that eventually… you find that it snaps and then drops and then that is a problem

Interviewer: And in terms of health and safety, how…

Respondent: Health and safety… health and safety it would be with the noise. Like you hear right now the jaw is running and we have a guy working there so the vibrations… you know… the whole day… you know… kind of thing. And the dust, we have dust masks but you know we haven't really had somebody who like… got sick and passed on because of but… you know… we assume that with that exposure, I mean… sometime it could happen but the nose is too intense and excessive

Interviewer: And then are there any measures?

Respondent: For the noise?

Interviewer: For the noise and the vibrations?

Respondent: For the vibrations we don't have measures. For the dust we have and for the noise we have but it is not enough for the jaw.. the guy is working on the jaw but it's more like what else can you do… [Mumbles plus voices at the background] but being exposed the whole day, you're just thinking, what else can you do

Interviewer: And then the training that you offer to employees in terms of health and safety, how adequate is it?

Respondent: The training… we do that in the toolbox talk… like… in the morning with the safety training and… yah… you know… just because we have PPE, mandatory, we know what you need to wear and stuff and all what you know… it's all the same, except the guy on very excessive noise areas… noisy areas… he wears like… he puts the big mask, even though they are not enough… you know… but then with these health and safety, everything… environmental we discuss them in the morning meetings and we have sometimes assessments… you know… not every now and then… maybe like monthly and we actually read of accidents which occur throughout the country… (name of company) because they sent those, they distribute

Interviewer: In terms of assessment, who does risk assessment?

Respondent: Supervisors

Interviewer: How often do they do it?

Respondent: Everyday

Interviewer: And then in terms of hazard identification, how much knowledge do employees have?

Respondent: We do that every day, in every activity no matter what

Interviewer: Who does it?

Respondent: The do, they do it. They are trained to do it; they do it and the supervisor has to approve of it… has to come and counter-check… if ever it's ok and then… they can proceed to work but they don't… we don't do anything without doing risk assessment, they know… they know

Interviewer: And in terms of monitoring… like employees are on the field, how often do your supervisors monitor them?

Respondent: Every now and then, just to see how far they are with the job and see how safely they're actually working

Interviewer: Have you ever had a day were there was maybe a shutdown, might me half day or full day due to something that might be a health hazard or safety hazard?

Respondent: That would be… hmm… that would be due to a DMR but otherwise us… because somebody got injured… now… cause we never had… we had minor… minor, you know… so only they DMR come… they are like, ok… in your COP you said the break lights they are A… A meaning you have to stop if they are not working and they come here and find that you are working with an A… it's your own standard that you drafted but then you find that you don't comply with it, hence they don't have a choice but to stop you and then you fix it… you gonna fix your whole COP because now you're working with what you said you're not gonna work with so that's the only shut downs we have that will be under safety… and if dust levels, maybe they check that and they see that you're working under very high dust accumulations or if it's noise… it's very excessive like 120 more or something like [word] than what is actually required as occupational exposure limit, that then, we get stopped but otherwise with the injuries side… inside… no cause we never had major

Interviewer: If there's nobody from outside doing the monitoring and then shutting you down and the levels are high… is only you within the company…

Respondent: We…

Interviewer: … do you stop by yourselves or you wait for… let's say inspector from outside and then coming here and shutting you down?

Respondent: No, we don't wait for them… we actually put in more controls… it's just sometimes, like for the noise… excessive noise, we put in the masks but we know it's not enough so we got to find a way… you know… to actually let these guys… hence maybe two shifts kind of a thing… the guy doesn't have to stand there for like the whole day because you got to stand on it… you got to stand on it and like… be able to see what's going on in the job. And the job like [makes sound] and the vibrations and crushing is too much… it's very intense. The noise that you hear right now is from the jaw that is like 350m away… almost

Interviewer: So are the…

Respondent: So the guy is standing there

Interviewer: Are there any measures now to try and control the level of noise like using PPE…?

Respondent: Not long ago, we gave the guys a big … working there and closer but it's… I don't think that it's enough. They wear the small pieces, you know those ear plugs and they put the [word] on top… you know but…

Interviewer: And then in terms of rotation, do they spend the whole shift on the machine or do you rotate them?

Respondent: Currently… currently because now the other control is making shifts; things some of the control trying to implement right now

Interviewer: Looking at the age of your workforce, are we…

Respondent: [mumbles]

Interviewer: … are we saying it's a… people who are very old, young people or middle aged? Middle age would be somewhere around 30/40

Respondent: Middle aged

Interviewer: And then… operating. Who operates these different machines?

Respondent: It's middle aged people

Interviewer: Experienced or…?

Respondent: They're experienced

Interviewer: How often do you train them in terms of using…?

Respondent: Quarterly. They get trained… yah, they get trained but the training is just to brainstorm cause already they have the skills… so we call the guy and he comes and he gives the guys some training… you know, we try to follow the quarterly part but sometimes you find that it's… maybe in a year it's like the first quarter and the last quarter sometimes you know but then they get trained… brainstormed I mean

Interviewer: And the age of your machinery equipment?

Respondent: We make sure that our checklists actually covers… with whatever that we said, well if there is a break down we fix… we don't work with a machine on minor, temporary… you know… fix or whatever that… you know. We make sure that we fix it up to its standard or according to the OEM thing that it has to be like that and the guys start working but otherwise we don't do any temporary work if we have a break down because that temporary… you never know what will happen next. The guy might be working on an edge and the machine goes off or slight… I don't know and then it's huge and the falls over… you gonna catch him here at the bottom and he is gone. So we don't… we don't… as supervisors we don't compromise on that note… no

Interviewer: And then regarding medical check-ups, how often does the company do it?

Respondent: Annually

Interviewer: Annually?

Respondent: Uhm…

Interviewer: Is it like when they go on leave only or is there a time were you just say for now we are doing medical check-ups?

Respondent: Yes, there's a time because we know… everybody goes at that time and we keep record. In the week in fact we know… we just schedule whoever is gonna within that week, everybody does the medical check-up and they gonna come… we gonna do again the following year within that specific week

Interviewer: And then should something happen in between, how then are you able to detect that this person has got maybe noise induced hearing loose or due to the exposure?

Respondent: They have to talk, cause with our safety meetings in the morning we actually encourage… you have to talk because we don't know… you know, but we see I'm calling you over and over… sometimes you might just get relaxed a bit and not… you know… take it further. If I'm calling you and you don't answer… I call you and not answer, call you and not answer… you find that the other person doesn't do anything about it… you know, it happens. It's just up to you to actually go to the management, you need check-up. There are medical aids, you're signed to make sure most… I

mean, they actually encourage everybody to have medical aid so you can just easily go… not say you don't have money and all… you go and do your medical check-up and… yah… you have to… you have to stand up for your own health because now company runs and you're gone or you at home sitting, they wouldn't stop cause you're sick or anything… they will run. It's a fact, so you have to take care… we encourage them to take care of their health that's it

Interviewer: You mentioned that there's [word] noise like vibrations… maybe an employee does not know that I'm suffering from maybe hand-arm vibration syndrome, how then will that employee, on his own, know that what I'm suffering from is due to the exposure to that vibrating machine?

Respondent: We… we just know that for any person to be exposed in such conditions it might not even be an effect anyhow, for instance but just knowing that for a person to be exposed to such the whole day it's not on… it can't be… you know, even though you know that, like for instance you're standing here the whole day, we supervise, we know that no you can't be standing the whole day… get a seat or have you know… this is it… you know… the way we… we have to take care of the employees in that sense cause they might not know… you know… you're supervisor, you supervise everything from safety to health, environment… everything… the working around. It doesn't happen so perfectly but there are certain things that… standing here the whole day might not been to… seem to be… like a dangerous or hazardous or risky thing… risky thing… you know, standing the whole day but… it might not seem so from the supervisor's point of view but you feeling it, you have to come forward… you have to come forward and say… you know… and…

Interviewer: And in terms of the wellness program, how are you doing it for your employees?

Respondent: We have a wellness training… we do, and… yah… we had one last year, I think it's annual. And we talk about finances, we talk about the person… you know, how they're actually doing at home; we talk about everything… everything… and where they can actually get help… ICASA something… yah… All that, we talk about those things

Interviewer: And then employees with such problems, how do you identify them and how do you assist them? Some with social problems

Respondent: Sometimes you know people don't talk, they tell friends. There's that person at work always wherever that you can actually can be open to, you know, so that person can talk to the person but we encourage that you don't keep it to yourself… don't keep it to yourself. It's very stressful alone and you could do stupid stuff. Talk to somebody, if you don't trust anyone, there's ICASA, like stated in the wellness. Contact them, tell them your problem and they will solve it for you

Interviewer: So within the company, do you have facilities for or somebody who is in charge of the wellness program?

Respondent: No, we don't

Interviewer: So you send them outside somewhere?

Respondent: We don't send them because we wouldn't know but… we don't know that you actually… you know… cause it's so personal to you, keeping it so personal and you might be pretending at work but at sometimes you're losing it. The management may not see it but the people you're working with might see it… they see it, they talk to you or you don't even talk to them for instance, then they will see it and will go and tell the supervisor… and the supervisor will tell them… I mean the supervisor will… we wouldn't come… we actually never had something so really intense but what I will do as a supervisor, I will actually go to you and discuss it with you and check if you need a time out… if you… how are things at home… everything. I will just try to brush it and I would even tell you that you don't need to tell me your problem, call this number and they will give you advice because sometime people don't feel free to expose themselves with personal matters so… yah

Interviewer: And then how do you do with workers who did not put in PPE or maybe during shifts they sort of removes PPE but continue working?

Respondent: I got to them, I tell them you don't do such because the thing is you get injured if you don't do it you're not gonna get compensated for it. We gave you PPE so you have to wear it… whether you… it is or not. This is in company premise, whatever happens to you, is going to affect… it has to… it's within the company

because it's a very hazardous area so whatever happens they have to compensate you but if it happens and they gave you PPE, you don't wear it, the problem is yours… the [word] will just… I don't know, it's… you got to do it… you just got to do it and believe you me, you're injured, you got hurt, the company will run still and then you will be… I don't know, maybe gone or disabled or maybe sitting at home doing nothing, we don't know or maybe losing your career, we don't know but you have to so I see him or I see her, straight go to her and even them within themselves, you see somebody is not putting on goggles, tell the person to put on goggles… they put… they're wearing their vest loose, they should zip it up because you get there and you have movement conveyers and all that stuff there, it will pull you in and it's very fast… so we encourage safety… we do, we do encourage it. We.re not perfect so you know… because accidents still occur, minor but it's important for people to know where they stand with safety

Interviewer: Looking at this company, what can you say are the challenges regarding health and safety up to now? Apart from the fact that you've got PPE, you do supervision…

Respondent: Probably not having enough workforce… uhm… like, a person who really, really looks into safety stuff… we don't have a safety department

Interviewer: Who does that presently?

Respondent: Supervisors. We all just [makes sound] take care of safety

Interviewer: Are you with them full time or you go at certain sessions, come back?

Respondent: Full time, like now… you know when I said 15 minutes is because I have to get back… so it's full time. We have to constantly watch their safety… constantly

Interviewer: So in terms of hazards… risks attached to the hazards, are there any challenges within the company so far?

Respondent: Hmm… sometime we might not identify everything. People get used to the paper work that oh… we have to do risk assessment and they just fill it… you know… and they don't put in all risk or hazards… you know… if they don't do that and you find that whatever gets you injures is actually from what you didn't put in… you didn't write it cause you didn't get… take the time to analyse everything around you

and see and… you know… so it's ignorance… and behaviour from people with attitude that actually leads to some accidents

Interviewer: But moving around, do you still see some of the challenges that maybe the company should address that might affect… that might be…

Respondent: Behaviour. It is behaviour and… of employees… yah… and I think there should be a better connection of the controllers because… because you find that in the morning you… uh… like the do an inspection on their machine while they are driving the machine already. You know you have to… it's a pre… you do it before you can actually operate… do you find that they do it while they're operating it or you try to rest [not sure about the word] alarm, the rest [not sure about the word] alarm is not working you [word] into somebody… you would have known if you did it before so with us here… I mean such has not happened but they might because they do their checks while operating so it's on the behaviour side, it's not that they are not told… we tell them every now and then but… yah… I guess it's just on that part

Interviewer: Regarding health and safety and management… the support. Do you get support from management in terms of or as management do you give workers support in terms of health and safety?

Respondent: I'd like to believe so, yes… I would like to believe so because what we fight of is what we fight of everyday… hey, wear your goggles. They [word] down so they continue wearing them, not that they don't have them… hey, zip. We fight every day, they have a vest one… you have to do your inspection while the machine is stopped before you start working… they know that already but we tend to say every day… you see so, it's like… it's really on the behaviour of the employees

Interviewer: Do these employees know the importance of PPE or the importance of safety?

Respondent: Yes, because every now and then if you find somebody… hey, wear your goggles… do you know [mumbles]… you try to explain, you have to do your inspections before you set your machine because we read accidents which occur throughout… you know… so… in the country, we read them… [word] flashes, news flashes, read them to employees… they know

Interviewer: They know and understand or maybe you just…?

Respondent: We translate in other languages. We read it in English and then we translate into Sepedi here because most guys are Sepedi and those who are not they understand Pedi or either English of which we don't have most… it's Abram, just few guys, maybe two; we don't have a lot here

Interviewer: So these employees, do they have things like manuals regarding health and safety… ant other material?

Respondent: No, we don't have

Interviewer: And then if you give training, what is it that you use to give them training?

Respondent: We have manuals, we read off the manual and then we speak it… we discuss it with them and then they sign on it then we put it. Tomorrow morning we read, sign and we put or we can repeat the same thing throughout the week, and the next week… you know, we just want everybody to know their safety conditions

Interviewer: So are there areas you think still need to be maintained, still need to be improved?

Respondent: Yah… uhm… I think every supervisor has a tangible work to do… you know and… having that lot and being so few, it's a lot and you can't constantly be there with an employee so we need to… that's where the improvement has to be.. they have to take control of the employees and own it to their own safety really… you can't… you don't run after people as though they are kids, you understand… they.. you have… people get tired of routine, they don't like routine… work is about routine

Interviewer: So you don't have safety reps? Is only supervisor who are monitoring

Respondent: There are safety reps. I'm a safety representative and I'm a supervisor and there's another supervisor on the other side, the mining section, and then there is another supervisor who's a safety rep on the plant side and we have a safety rep working overall safety … I think it's the guy that you just interviewed… so, we doing it ourselves cause we don't have a safety department. As they busy… head office, busy sorting that out, we taking that upon ourselves cause we have to

Interviewer: Ok, thanks very much for your time.