THE IMPACT OF CARDINAL RULES ON EMPLOYEE SAFETY BEHAVIOUR AT POWER STATIONS IN MPUMALANGA

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ABSTRACT

Tittle: The impact of cardinal rules on employee safety behaviour at power stations in Mpumalanga

Key terms: training and supervision, safe work procedures, management commitment and behavioural safety.

Occupational risk management can be a catalyst in generating superior returns for all stakeholders on a sustainable basis. A number of companies in South Africa have implemented Cardinal Rules of Safety adopted from international companies to ensure the safety of their employees. The purpose of this study was to measure the impact of the cardinal rules on employee safety behaviour implemented at power stations in Mpumalanga.

The empirical study was done by using a questionnaire as measuring instrument. The questionnaire was developed from a literature review and contains questions and items relevant to the initial research problem. The questionnaire comprised of five-point Likert scale type questions.The convenience sampling method was applied identifying 90 participants at three different power stations in Mpumalanga taking part in the study.

Statistical analysis was performed by the Statistical Consulting Service of the North-West University using SPSS. Cronbach's alpha co-efficients was used to determine the reliability of the factors. Descriptive statistics (Mean, standard, deviation, were used in the compiling of the profile of the results. While Spearman's rho correlation coefficient was calculated to identify practically significant associations between variables and factors

The research findings suggest that there is practical significant correlation between the factors that were measured. The opinion given by respondents suggests that cardinal rules of safety were implemented, given all the necessary support by management and enforced throughout the organisation.

TABLE OF CONTENTS

List of tables

List of Figures

CHAPTER 1

INTRODUCTION

1.1. INTRODUCTION AND BACKGROUND

Occupational risk management can be a catalyst in generating superior returns for all stakeholders on a sustainable basis since injuries at work cost organisations a lot of money. NOSA which is a leading global supplier of occupational risk management services and solutions is one of the most recognised brands in SHEQ risk management (NOSA, 2011). It provides value-added initiatives for creating a safe working environment. Internationally, ISO focus on safety standards which must be used to protect users of all types of machinery for all businesses, government and society at large (ISO, 2011).

Whether one is pouring concrete, mowing the lawn or working on the lathe, machine operating can result in serious injury. ISO develops these standards which work together with industry, health and safety bodies such as the International Labour Organisation and the World Health Organisations with the intention of reducing the risk of injuries. The benefits in having a good Safety Management System in streamlining the safety processes are:-

1. Being able to evaluate the organisation safety performance at any given time;
2. and being able to put in place measures to reduce the prevalence of safety-related incidents.

These result in a saving in time, money and resources (Atkins, 2011). The government requires all organisations to comply to the OSH Act which aims to “To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery, the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work,

to establish an advisory council for occupational health and safety, and to provide for matters connected therewith" (OHSAct: 1993).

The OHSAct also highlights specific obligations for the employer, namely:

- To provide and maintain systems of work, plant and machinery that are safe and without risk to health;
- To eliminate or mitigate (lessen) any hazard or potential hazard to the safety or health of employees, before resorting to personal protective equipment;
- To make arrangements to ensure the safety and absence of risks to health connected to the production, processing, use, handling, storage or transport of articles or substances;
- To establish what the health and safety hazards are related to any work procedures/systems.

Once risks have been identified, consider what precautionary measures should be taken for these health and safety hazards and implement those precautionary measures.

Eskom is committed to health and safety excellence, which forms an integral part of their operations. Eskom and its subsidiaries conduct business with respect and care for people to ensure that no operating condition, or urgency of service, should endanger the life of anyone or cause injury or damage to the environment which is in line with the requirements of OHSAct and NOSA. It is from the same background that Eskom came up with the "Cardinal Rules of Safety". Cardinal Rules are safety rules that describe such extreme behaviour that all reasonable employees would agree that anyone knowingly and wilfully violating one of them would be putting his/her life and any other person's lives in jeopardy, and should therefore be dealt with seriously

A number of companies in South Africa are using Cardinal Rules of Safety and have adopted these from international companies. Companies like SASOL, supported by DuPont after their Safety Review in May of 2005, Arcelor Mittal and Eskom have also implemented Cardinal Rules of Safety.

Other institutions, for example the Institute of Business Management and Information Technology in Cape Town have also implemented “Cardinal Rules of Safety. Their basis for implementing these safety rules was because of challenges in the Institution when it comes to discipline, especially with the large population of students with diverse socio-economic backgrounds. While they did not want to impose a harsh authoritarian regime in the Institution, they had to find the happy medium that would enable them to “pull in the reins when they have to, and let them go” when appropriate.

International Corporations like Knife River implemented Cardinal Rules of Safety to complement their existing Safety Best Practices and address safety procedures to be followed at all locations. The rules place the highest priority on people and hold each employee accountable for his or her actions. At Knife River Corporation, violation of the Cardinal Rules of Safety results in disciplinary action, and for ten consecutive years, Knife River has improved its safety performance. Another example is P&H MinePro Service which implemented Cardinal Rules of Safety with a slogan that says *"No task is so important, no schedule so urgent, that the job cannot be done safely”.*

Cardinal Rules of Safety in organisations come in different forms, but mainly to address the behaviour of employees towards safety. Some safety rules focus on changing personnel behaviour towards plant safety and some towards the safety and welfare of employees towards each other, where other safety rules focus more on addressing safety with the aim of improving the organisation’s image and improving external stakeholders’ perception of the company. Cardinal Rules of Safety provide guidelines on how workers should conduct themselves when working, or towards work and how workers should behave when employed in a company.

The Eskom "Switched on to Safety Excellence" Program was implemented and aimed at building a sustainable foundation for safety performance excellence. In the quest to eliminate injury, loss of life and achieve Eskom's goal of ZERO HARM, Eskom has identified critical behaviours or actions that, when performed, have a very high probability of causing incidents resulting in

severe injuries or fatalities. In order to prevent these unacceptable consequences, management and leadership have made the decision to reinforce and roll out five Eskom Cardinal Rules of safety that applies to Eskom employees and to any persons or contractor performing work for Eskom.

The Eskom Cardinal Rules are different from regular safety rules in that they are considered “higher order” rules within the organisation, in that if violated, will result in disciplinary action. There may be instances where divisions within Eskom have additional cardinal rules addressing their specific risks but these will be supplementary to the five Eskom Cardinal Rules of safety, which will have a higher priority.

Eskom management was under the conviction that these Cardinal Rules are REASONABLE, as it is considered unfair for any organisation to allow people to take chances with their lives and those of others on safety matters. Eskom has a duty towards its employees to see to it that they follow the agreed work practices WITHOUT EXCEPTION. Some of the cardinal rules are easy to implement since they only require commitment but some take time to see the results since they require change in behaviour of the target group of employees.

The following Cardinal Rules of Safety were implemented and applied in the whole of Eskom:

- Rule 1: Open, isolate, test, earth, bond and/or insulate before touch
- Rule 2: Hook up at height
- Rule 3: Buckle Up
- Rule 4: Be Sober
- Rule 5: Ensure that you have a permit to work

Cardinal Rules by their nature seem to be addressing issues at grassroots level (bargaining forum) and tackling issues that prevent organisations from performing optimally. They also seem to affect and aim to change the

behaviour of the less literate in the organisation since they don't always see the long term or bigger picture effect of their actions or the consequences of their actions or behaviour. Cardinal Rules at the same time are easily adopted by the new appointees in the organisation as compared to the longer serving members of staff, since new employees are introduced to Cardinal Rules as they start with their jobs in the company.

In the mining industry people are killed and we are still to hear of a director or CEO of the company involved who is jailed for negligence regarding safety that led to such fatalities. Cosatu has been very vocal regarding this issue, but it seems like their voice is not big enough to draw the necessary attention. A lot needs to be done in terms of training workers to practise safety and the benefits when they do so.

After the implementation of Cardinal Rules of Safety in 2007 at Eskom Power Stations, a number of employees have been disciplined and some cases resulted in dismissal depending on the severity and merits of the violation. Inconsistency in the application of discipline has been a concern at different Power Stations within Eskom. Experience and competency of people chairing cases has come under fire as well, resulting in Eskom losing some cases or being taken to the CCMA.

The paper intends to determine the impact of Cardinal Rules of Safety on employees' behaviour. It intends to check the consistency in adherence to these cardinal rules. Company/organisation adherence to safety is a requirement by the Department of Labour, and also according to Occupational Safety and Health Act (OSHAct) of 1993. In determining the impact on employees' behaviour, the paper will even determine different levels within the organisation where cardinal rules have the most impact on behaviour change. This will be measured by looking at different departments and level of responsibility in Power Stations in Mpumalanga. Resistance to change process starts in the mind of every employee. If an employee is not willing to change, this might leads to them finding alternatives between cardinal rules and means of non-compliance without being caught. The employee will weigh

the relative advantages and disadvantages for the decision while looking for the alternative. The above has led to internal and external research on this unwarranted behaviour.

Then follows a process of decision-making for implementation by the organisation and using the cardinal rules by employees, and then the post-compliance behaviour, which is also very important, because it gives a clue to the change agents which were influencing the endeavour towards implementing Cardinal Rules for Safety, ie whether it has been a success or not.

In today's work environment, improvement on safety statistics brings about a good image and boosts employee morale resulting in a good company financial turnover. Employees' perception of safety is key to either a safer or more dangerous environment, therefore it is every employee's responsibility to abide at all times by the Cardinal Rules of Safety.

1.2. PROBLEM STATEMENT

The focus of the research is to measure the impact of Cardinal rules of safety towards employee behaviour at Power Station in Mpumalanga. This research will also reveal the attitude and beliefs of the people about the Cardinal Rules of Safety, and what are their preferences when applying these safety rules. It will also assist in identifying the contributing factors in the way they behave and how this implementation affects their day to day activities at work. The reasons will range from factors such as: Whether their preferences are influenced by the lack of discipline, difficulty to comply with some rules (used to the old ways/habit of doing things), environment in which these rules should be applied (influenced by their peers not to comply), and the way they were implemented or imposed on the organisation (change process).

Employees want a quick and easy way to do their (daily) routine work activities and to be given a reason why things should be done in a certain new

way and not the old way. This will influence the decision making process and behaviour towards the Cardinal Rules of Safety.

1.3. OBJECTIVES OF THE STUDY

The objectives of the study consist of primary and secondary objectives. The primary objectives result in the formulation of the secondary objective.

1.3.1 Primary objective

The primary objective of this study is to measure the impact of Cardinal Rules of Safety on employee safety behaviour at Power Stations in Mpumalanga. This will be limited to what can be observed and measured objectively and independent of feelings and opinions (Welman, *et al*. 2010:6).

1.3.2 Secondary objective

The secondary objectives of this research are:

- To measure the importance of these factors on safety
- To compare the results of the findings with those who are following the cardinal rules religiously by looking at the Safety statistics since the implementation of cardinal rules.
- Evaluate whether the fear of being taken to disciplinary hearings is key for employee compliance to cardinal rules, or is one's own safety that which compels employees to adhere to cardinal rules?

1.4. STUDY OF RESEARCH METHODOLOGY

The research includes gender, various ages, status across the Power Station, background, and work experience (years worked) and of all representatives of Power Stations populations. The sample population is based at three Power Stations in Mpumalanga. The Convenience sampling method will be used to identify the sample. The target maximum number of participants will be 150 and the minimum will be 80.

A questionnaire as measuring instrument will be designed and utilised. It will consist of a set of questions which will be used to gather a range of pre-determined responses to measure the attitudes and beliefs of participants towards Cardinal Rules of Safety. Participants will be required to complete questions regarding the work environment and behaviour these safety rules have created in order to assist the sampler when doing data analysis.

Structured questionnaires will be used for this research to obtain a suitable sample, and will be in English being Eskom's preferred language of communication. The majority of the target population have as a minimum a grade 12 qualification and can read and write in English. Secondary data analysis will be using existing records of cardinal rules violations since the inception of these rules. This will also compare what time of the year is most prevalent to cardinal rules violations. This information will be sourced from the Industrial Relations office.

The questionnaire will comprise five-point Likert scale type questions. A Likert Scale is often used in survey design to get around the problem of obtaining meaningful quantitative to restrictive closed questions (Keegan, 2009). Permission will be obtained from Power Station Managers to use business units for this research and also to use Power Station employees for this research. The Employees will be asked to indicate their willingness to participate and co-operate in answering the questionnaires. Employees will be assured that the information received will be treated as confidential, ie they will remain anonymous, and that the results will be used for research purposes only. Power stations' management will be assured that the outcome of the study will be made available or shared with the business unit and within Eskom as a whole should they be interested.

The sampling method will seek to answer the objectives listed above. The reason for choosing Power Stations for sampling is because of the availability and accessibility of information and participants. Qualitative research will be used to process and analyse literature study and statistics. This information

will be analysed and used as supportive data for the structure of the research project.

1.5. DEMARCATION OF THE STUDY

Chapter one : Introduction and background

Chapter 1 consists of the introduction, background, the problem statement, and the research proposition formulated for the research project. This chapter introduces the research methodology about the impact of Cardinal Rules on employee safety behaviour at a Power Station.

Chapter two : Literature review

The chapter discusses the literature review on impact of Cardinal Rules of Safety on employee behaviour. It will also discuss an effective change management process, safety behaviour, employees' self-awareness and causes of accidents and incidents.

Chapter three: Research Methodology and Results

Chapter 3 discusses and presents the results of the research project.

Chapter four : Conclusions and Recommendations

Chapter 4 lays out the conclusion and recommendations drawn from the research conducted.

1.6. SUMMARY

Chapter 1 is an introduction to the research project, to put the reader in the picture and to give an understanding of cardinal rules and their impact on employees' behaviour as the focus of the research. Chapter 2 forms the core of the research since it provides the literature review on the impact of change on human behaviour.

CHAPTER 2

LITERATURE STUDY

2.1. INTRODUCTION

The literature will be studied to explore the factors that impact on employee safety behaviour. The management process employed and factors which influence the safety culture and behaviour within an organisation such as safety training and supervision, safe work procedure, management commitment and behavioural safety will be explored.

The importance of these cardinal rules on safety is that by looking at different processes which are meant to support the initiative also outlines the existing perceptions employees have on the cardinal rules of safety. For the purpose of this study, reinforcing new behaviours is key to the success of the implemented safety rules. This is so because complying with these rules is not only a requirement by Power Station employees but by our Government (Buckle up and be sober) and the Occupational Health and Safety Act of 1993 (test before touch, permit before work is done and hook up at heights). People generally do things that bring them rewards/benefits and consequently one of the most effective ways to sustain momentum for change is to reinforce the kinds of behaviour needed to implement the change (Cummings & Worley, 2009:183).

Change in behaviour which is brought about by the introduction of Cardinal Rules of Safety differs from transformational change. Transformational change focuses on changing the basic character of the organisation (organisational structural change in response to environmental changes or aligning the organisation to new technology). Implementation of the Cardinal Rules of Safety on the other hand does not change the organisational structure but might have some adverse effect on the behaviour, morale, and productivity of employees since some of the rules challenge the way things

have always been done. This is more of an organisational reform because it focuses on employee perceptions, attitudes and behaviour within the existing paradigm while keeping the status quo of the organisation the same but improving awareness and vigilance on safety.

The manner in which new ways of doing things are managed and implemented is the subject of the change management process. Change introduced in an organisation might not affect people in the same way. Looking at the research topic, technical people are more affected by the cardinal rules of safety introduced as compared to non-technical personnel. This has the potential of creating perceptions that some personnel are treated better compared to the others. Two of the rules are applicable to all (buckle up and be sober) and the other three (Hook up at heights, permit to work and test before touch) only applies to technical employees because they are plant related safety measures.

Every employee within the organisation plays an important role in embracing the Cardinal Rules of Safety to be successfully implemented. To introduce new things within an organisation, many models, methods, techniques and tools are used, however all follow certain structured organised process which have proven to be successful (Gill. 2003:307). It has been said by different speakers and authors that “One thing that remains constant is change” therefore it is inevitable but what is important is how it is implemented within an organisation/institution, and does the targeted audience see the value in the initiated process.

The new rules according to Micheal Jackson (2011:2) in his article “Change ahead” say “It’s what you do today plus what you need to do differently – that will determine the course of any current and future business success”. Micheal Jackson believes that repetitive and similar business activities all across the globe have led many businesses down the same blind alley. This means that change is inevitable in any business but managing change is very important. Introduction of cardinal rules is no exception to affecting employee

behaviour since violation can lead to disciplinary action which might result in dismissal.

2.2. ORGANISATIONAL CULTURE

2.2.1. Organisational culture defined

Organisational culture may be defined as the accepted norms and values that are associated with a particular Company. These norms are seen as distinctive to a particular organisation and normally affect the way specific organisations go about implementing their organisational goals. These norms are also passed on from one group of the organisation to another. Organisational culture is closely related to organisational strategy. If new strategies are incompatible with the kind of culture prevailing at that time, then chances are they might fail. Any particular form of organisational culture is affected by the way employees, employers and shareholders communicate with each other (Smith, 2010). The above is a testimony that organisational culture can be an enemy to organisational changes if the proposed changes or strategies are not in line with prevailing culture. The drawback can vary from culture being a barrier to new initiatives and improvement (Cardinal Rules of Safety), barrier to diversity, barrier to cross- Departmental and cross organizational cooperation, or barrier to mergers and acquisitions.

There are many different definitions of organizational culture but Organizational culture simply refers to the general culture within a company or organization. Organisational culture has become one of the most important concepts in organizations due to its influence on business strategy and growth. Gareth Morgan has described organizational culture as the set of beliefs, values, and norms, together with symbols like dramatized events and personalities that represents the unique character of an organization. Organizational culture is a pattern of shared basic assumptions that the group learned as it solved its problems that have worked well enough to be considered valid and is passed on to new members as the correct way to perceive, think, and feel in relation to those problems (Cummings & Worley,

2009:2). Culture as seen from these definitions, assumes that it is created by people jointly and that defines the way they live in a particular environment. In all essence, it is very clear that culture can be changed, it can influence performance of the organization and it is not to be overlooked. It is through observing organisational culture that new strategies are employed to either change undesirable behaviour or enforce good behaviour. Cardinal Rules were meant to enforce good safety culture throughout the business.

2.2.2. Impact of organizational culture on safety performance

Organizational culture impacts on policies, operations and the day-to-day running of the workforce. It can be a partner or catalyst in process improvement efforts or it can be its downfall. Organizational culture can be a source of competitive advantage or an obstacle to meeting business objectives (Buttles-Valdez. 2008:10). The discussion above clearly indicated that culture is about how the organization structures itself, its rules, procedures and beliefs to make up the culture of the company. In the process of structuring, an “enculturation” process emanates and influences the behaviour of employees; creates certain values, norms and beliefs/ideas in the organization. This affects every aspect of the business including safety performance. For organizations to maintain a competitive advantage in a global, rapidly changing and technological environment, they must ensure that people, processes, technology and organizational culture are adaptable, aligned and support the business objectives and strategies. Eskom’s Cardinal Rules of Safety aim to take care of people who bring knowledge, skills and process abilities (competencies) to the organization so that the same people can safely bring profits to the organization.

2.2.3. Conclusion

Since culture emanates from norms, it is very important for the organisation to portray the right culture and always steer away from anything that seems not to support good behaviour or instil good culture. It is the role of management through its employees to define the type of culture they want to adopt within

their organisation. If the organisation wants to be known for its good safety performance, it must enforce and live up to that expectation, portraying such behaviour throughout the organisation so that no one will have an excuse not to adhere to the required behaviour. Organisational culture has the potential to make or break the organisation, because for any strategy to work, the culture should be right for such to be implemented.

2.3. SAFETY CULTURE IN AN ORGANIZATION

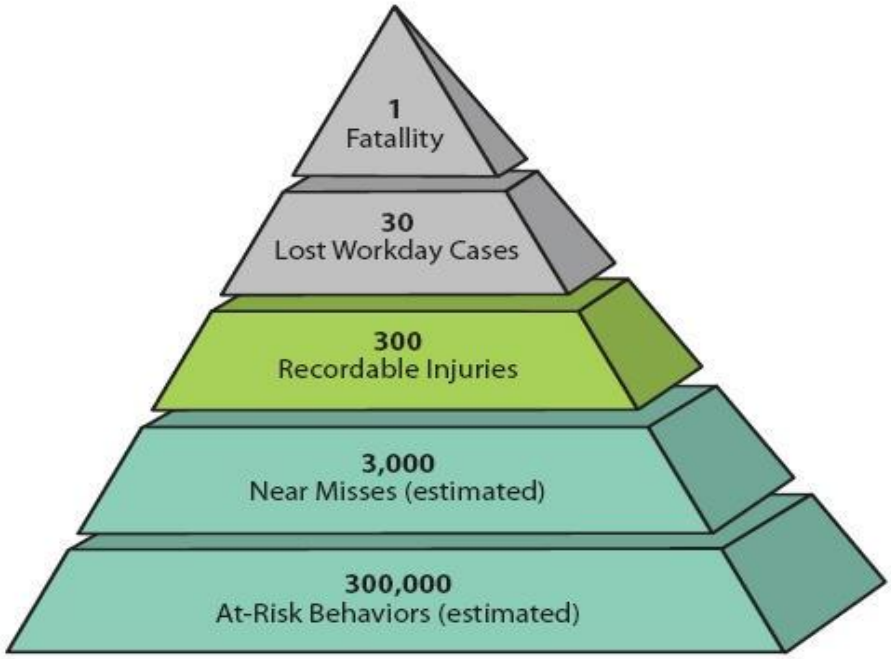
2.3.1. Safety culture defined

There are a number of definitions from the school of thought on what a safety culture is, but it is obvious that safety culture can be defined as the organizational atmosphere where safety and health is understood to be, and is accepted as, the number one priority and it is regarded as part of the overall corporate culture. This means that it is not isolated from other aspects of the organization such as finances and people management.

2.3.2. Factors that influence safety culture in an organization

Because of the uniqueness of the organizations, it is still a challenge to have common causes influencing a good safety culture. What is common though is that for the safety culture to be harnessed in any organization there should be first a supportive and compliance culture by all within the organization. According to Conoco Phillips Marine (2003) in their accident pyramid concluded that fatalities are as results of risky behaviours which are defined as activities that are not consistent with safety programs, training and components of machinery (see the Accident Pyramid below).

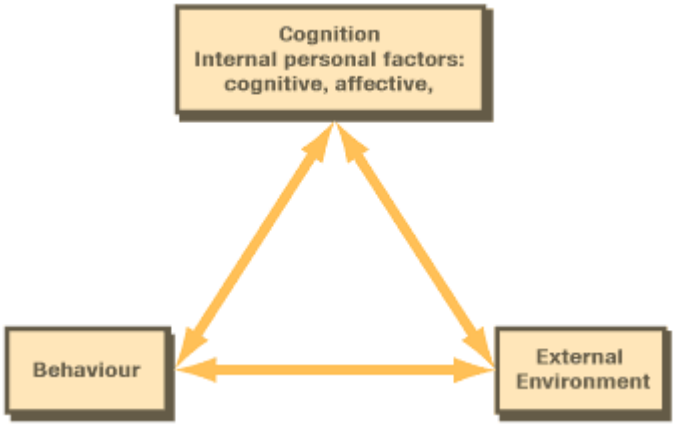
Figure 2.1. Accident pyramid



Source: Conoco Phillips Marine accident pyramid 2003

The above accident pyramid stated that if the organization effectively manages risky behaviour it will definitely have an impact on eliminating injuries and fatalities. According to Bandura's social cognitive theory, the argument is postulated that people do not operate in isolation, but rather are the products and producers of social systems. Attitudes, both personal and organisational, affect the development of a safety culture in the workplace. The environment in which people work and the systems and processes in an organisation also influence the safety culture. Therefore, each organisation needs to consider all of these aspects in developing and nurturing a safety culture that suits the organisation and the individuals within it. This is further explained by the theory by Bandura using the social cognitive approach.

Figure 2.2. Social cognitive approach



Source: Bandura – The social-cognitive approach

The social cognitive approach suggests that change initiatives which do not consider the reciprocating relationship between all factors on the triangle above when developing safety culture are doomed to fail. Therefore each organization needs to consider all of these aspects in developing and nurturing a safety culture that suits the organization and the individuals within this model.

A study done by Ardern (2006:1) suggests that for a good safety culture to be entrenched in an organization, the following should exist:

The organization must adopt safety and health as a core value and actively care for the workforce. This commitment should be shown at all levels of the organization

- Risk management of safety and health issues should not be treated as a cost but as a way to improve the performance of the organization. Safety and health should be treated as an investment and funded accordingly
- Safety and health should be integrated into every part of the organization and should be continuously improved. This means that resources and time should be set aside identifying weaknesses and, developing strategies aimed at resolving and strengthening safety performance.

- Employees should be given regular information about safety and health at work in order to be more likely to be mindful of safety and health issues and the ways in which their actions can affect themselves and others. Employees should be properly trained in their jobs and made aware of the hazards associated with the role they perform so that they will be less likely to suffer or cause injury.
- Management systems, safety systems and individual attitudes and perceptions can be researched, measured and analysed to gain a picture of the current state of the organization and reveal barriers that prevent people from performing at their best. Climate surveys can be conducted at regular intervals in organizations that strive for a good safety culture to measure successes.
- Trust is an essential part of a good safety culture and often the most difficult hurdle to overcome in establishing a safety culture. Everyone in the organization must be encouraged to realize that incidents are worth reporting and everyone must feel comfortable in correcting unsafe practices across, down and up the hierarchy of the organization. If this is the case, management will actually know what is going on and the workforce will tell the truth, even if it is not what management may want to hear.
- A good safety culture makes it worthwhile for everyone to maintain a state of awareness by celebrating success whether big or small, therefore it is worthwhile implementing a system that will recognise and reward success with the aim of reinforcing good safety culture by giving feedback. to the workforce

2.3.3. Conclusion

It is easier to promote a safety culture as compared to bringing about changes in productivity, quality and profitability, since the benefits of adhering to a safety culture are for both employer and employees alike to share. Establishing and developing a positive safety culture is cost effective, increases productivity and efficiency and also improves the organization’s

bottom-line and image. This is one area in which both management and employees can practically see the benefits if both parties embrace the safety culture.

2.4. SAFETY AT WORK

The Occupational Health and Safety Act (No. 85 of 1993) states that the general duties of employers to their employees is to make sure that they provide and maintain as far as reasonably practicable, a working environment that is safe and without risk to the health of his/her employees. This means making sure those workers and others are protected from anything that may cause harm, and effectively controlling any risk to injury or health that could arise in the workplace.

Even with the above Act, each year, an estimated two million men and women die as a result of occupational accidents and work-related diseases (Comavia, 2005). Experience has shown that effective preventative safety culture is beneficial for workers, employers and Governments alike. Collaboration from all interested parties, collective bargaining between trade unions and employers and an effective health and safety legislation backed by strong labour inspection can help in creating safety awareness and reducing work related accidents.

2.4.1. Safety behaviour

Promoting safety behaviour at work is a critical part of the management of health and safety because behaviour turns systems and procedures into reality. Good health and safety systems do not ensure successful health and safety management but the level of success is determined by how organizations live their systems/values.

Barling and Frone (2011) states that statistics from the work environment indicate that 80 to 90 percent of all accidents are directly related to, employee behaviour, which provides an important link that paves the way for many pre-

existing factors for safety accidents and incidents to be determined. Safety in the workplace is influenced by a number of factors such as the organizational environment, Management attitude and commitment, the nature of the job or task, and the personal attributes of the individual. Safety related behaviour at the workplace can be modified by addressing these major influences. There is strong research evidence that behaviour modification techniques can be effective in promoting critical health and safety behaviour, provided they are implemented effectively with continued support from Management (Barling and Frone, 2011). Typically, a behaviour-based safety system consists of identification of behaviour which could contribute to or have contributed to accidents, on-going observations and feedback, information collection and problem solving to improve the identified behaviour and management system that produced them and the use of all information to identified corrective actions.

2.4.2. Factors that influence safety behaviour in an organization

There are many factors that influence safety behaviour at work which can be attributed to individual differences. In order to understand why individuals behave in a certain way in certain circumstances, it is important to understand what factors influence such behaviour (Fishbein *et al*. 2007). A few of these factors will be discussed below.

2.4.2.1. Personality

Kreitner *and* Kinicki (2008) define personality as the stable physical and mental characteristics that a person identifies with and they also agree that personality is formed from the interaction of genetic and environmental influences. This is a very important aspect of human attributes which management should understand because it will allow them to understand and predict an employee's behaviour in different work situations.

2.4.2.2. Skills

Organizations tend to value skilled and scarce resources more highly than those that are perceived to be more freely available. Employees who perceive themselves to be skilled may behave and perform differently as compared to those with less skills. Kreitner *and* Kinicki (2008) define skill as a specific capacity to manipulate an object and this is seen as task- related competencies. This means that abilities and skills play a role in individual behaviour and which adversely affect the performance. The effect of such behaviour can be either positive or negative.

2.4.2.3. Anticipated outcomes (Attitudes)

Kreitner *and* Kinicki define attitudes as the learned pre-disposition to respond in a consistently favourable or unfavourable manner with respect to a given situation/object. This means that an individual attitude is shaped by previous experience and learnings/encounters and this makes it clear that individual attitudes do determine the individual's behaviour at/in a given time/situation.

2.4.2.4. Beliefs and Social validation

This can be describe as a tendency of an individual to imitate the behaviour of those around them with a belief that says "If everyone else is doing it, it must be a good idea" In most cases employees imitate fellow employees whom they regard as role models or more experienced. This might not be necessarily the right behaviour but employees tend to follow it because it has become a belief, and they disregard their own observations in order to comply with those of a group. Social validation can also be adopted for social bonding reasons {according to TIMA consulting} (2011) and have a potential for increasing group cohesion. Beliefs and social validation can be influenced by the business through its way of communicating, reward and recognition systems, organizational values and inherent culture.

2.4.2.5. Perceptions and reciprocity

TIMA consulting defines reciprocity as the tendency to respond to a favour with a favour. When the favour is accepted the giver can be confident that the receiver will feel an obligation to respond appropriately. This is not always true, since it's a perception by the giver. Bratton *et al* defines perception as the process through which individuals receive signals from the environment, organization and combining these signals so as to make sense of what was experienced/making sense of the world around us. The definition suggests that there are stages which individuals undergo in order to create their own world/perceptions which are namely, attention and selection, organizing and recognition and finally interpretation and decision-making. Throughout the above process, not all stimuli would be considered, interpreted and ultimately lead to certain behaviour. In the workplace situation, perceptions are largely about people and situations, reciprocity and therefore elements of social perception come into play. Therefore in order to get people to work safely, it is crucial that individual perceptions about risk are increased and risk tolerance is decreased

2.4.2.6. Motives and liking

Motives play a role in influencing behaviour on how people prioritize their needs and a person is more likely to comply with a request from someone they like, which is an important attribute of a relationship. The above factors tend to impact on performance, because people will work in order to attain certain goals, retain friendship which they value, and attain a level of satisfaction from performing a task, which in their own terms adds value to them.

2.4.3. Conclusion

It is very important for the organisation to understand its employees' behaviour. This will help when implementing changes within the organisation and also in averting unwarranted challenges from labour. It has been proven

through research that positive behaviour can enhance positive safety performance. Employees want a reason for doing things and they will support initiatives which have elements of benefitting them. Management should make it their prerogative to encourage employees to realise the importance of adhering to safety.

2.5. RELATIONSHIP BETWEEN BEHAVIOUR AND SAFETY INCIDENTS

It has been accepted by many researchers that unsafe employee behaviour at work places is one of the primary determinants of occupational accidents. Sadullah and Kanten (2009) concur with this notion and state that safe or unsafe behaviour of the employees is affected by certain organizational factors which result in work accidents/incidents. Since occupational safety aims to prevent the accidents/incidents caused by unsafe behaviour of employees, and creating a safe environment which is in line with the Occupational Health and Safety Act (No. 85 of 1993), it can only function effectively if the organizational climate supports and encourages employees to exhibit the behaviour required. Generally the causes of occupational accidents are mostly as a result of unsafe conditions and unsafe behaviour.

A study done by United Steelworkers of America (1995) concurs with the above findings by saying that almost all accidents result from unsafe acts and for every accident there are many unsafe conditions, as well as behaviour which workers engaged in. Workers behaviour towards safety can be seen in the way they treat measures that are in place for enhancing safety, namely:

- Use of personal protective equipment by the worker
- Body position or the position of the worker in moving machinery environment
- Actions by workers – “horseplay” at work
- Following of safe work procedures by workers
- Housekeeping or orderliness
- How they use tools and equipment

The above reinforces the notion that behaviour focuses on external factors as opposed to motivation theory, which relates to internal factors that influence behaviour (Gibson *et al.* 2000:127). Huczynski and Buchanan (2007:117) in their study concluded that organizational behaviour is modelled on the idea that behaviour is influenced by consequences and that employee behaviour can then be affected by reinforcing the consequence for not portraying or adhering to correct safety behaviour.

2.5.1. Conclusion

It is very apparent that workers behaviour towards safety cannot be separated from safety accidents / incidents in the workplace. Management directives on safety performance are aimed at preventing occupational accidents/incidents at work, and should create a culture which recognizes and rewards workers attitudes and behaviour for being good ambassadors of safety.

2.6. COMMON CAUSES OF SAFETY ACCIDENTS/ INCIDENTS:-

People become disabled, injured, or are killed at their workplaces due to industrial accidents. Accidents cause both human suffering and considerable expense in loss of production and material damage. The accident may be in many ways and statistics show that 80 out of every 100 accidents are the fault of the person involved in the incident (accident). Unsafe acts cause four times as many accidents & injuries as unsafe conditions (tool box topics.com). Accidents occur for many reasons and in most industries; investigators of accidents tend to look for "things" to blame when an accident happened. It is easier to blame someone/something than to look for the "root causes". Through proper accident investigation we can find out why accidents happen and how they can be prevented in the future. The most common causes of accidents and incidents are:

Taking Shortcuts: Every day we make decisions we hope will make the job go faster and more efficiently, but in the quest for saving time we forever risk

our own safety, or that of other team members. Short cuts that reduce safety while doing the job are not short cuts, but an increased chance for injury.

Being over- confident: Confidence is a good thing but over-confidence is too much of a good thing. "It will never happen to me" is an attitude that can lead to improper procedures, tools, or methods used when performing a task which might result in an injury.

Starting a task with incomplete Instructions: To do the job safely and right the first time requires complete information. Employees should not be shy about asking for explanations about work procedures and safety precautions. It is not dumb to ask questions before proceeding with a task.

Poor Housekeeping: When clients, managers or safety professionals walk through a work site, housekeeping is an accurate indicator of everyone's attitude about quality, production and safety on the particular site. Poor housekeeping creates hazards of all types. A well maintained area sets a standard for others to follow. Good housekeeping involves both pride and safety.

Ignoring Safety Procedures: Purposely failing to observe safety procedures can endanger employees' lives. Employees are being paid to follow the Company safety policies, and not to make their own rules. Being "casual" about safety can lead to a casualty!

Mental Distractions from Work: Having a bad day at home and worrying about it at work is a hazardous combination. Dropping one's 'mental' guard can distract you from following safe work procedures.

- **Failure to Pre-Plan the Work**: There is a lot of talk today about Job Hazard Analysis. JHA's are an effective way to figure out the smartest ways to work safely and effectively. Being hasty in starting a task or not thinking through the process can put employees in harm's way.

- **Technical equipment:** lack of equipment or faulty design leading to a sequence of unexpected events which finally result in an accident.
- **The working conditions**: The working conditions can influence workers indirectly thereby causing accidents. Such factors include: disorder at the workplace, noise, temperature, ventilation and lighting.

Mark Twain once said "It is better to be careful 100 times than to get killed once."

2.7. GROUP THINK-TANK EFFECT ON EMPLOYEE SAFETY BEHAVIOR

Group thinking is defined as the tendency of the members of a group to yield to the desire for consensus or unanimity at the cost of considering alternative courses of action. Group-thinking is said to be the reason why intelligent and knowledgeable people make disastrous decisions according to Goessl (2009). Group thinking is regarded as a circumstance where a cohesive number of people who work closely together come up with poor decisions and sometimes just make bad choices because the group has over the time spent together developed a similar manner of rationalization, justification and (group) thinking. The challenge with this option is that the group has reached a mode where everyone tends to agree in every circumstance or decision because opposing it can affect affiliation to the group.

Inability to think “outside the box” is an attribute of the “group think” affected group. If the group becomes over-confident in their decision making, this shuts out any opportunity to explore diverse options or any other potential solutions or ideas. In this case opinions from those who dare to challenge the group are likely to be disregarded regardless of how good they may be. This means that “groupthink” has the potential to stifle innovation. Even though “groupthink” is easily noticeable, it is a difficult barrier to break. It is therefore imperative for the organization to periodically examine any evidence of “groupthink”. This will assist in making efforts to diversify the teams which seem to have the “groupthink” effect before it plagues the whole organization.

2.8. HOW TO EFFECTIVELY IMPLEMENT SAFETY RULES AT WORK

Since change is not a “one size-fits-all” situation, it needs to be managed in order for all involved to embrace the proposed Cardinal Rules of Safety. It is still evident that after the implementation of the Cardinal Rules of Safety, employees are still caught violating them. Certain ways need to be applied consistently for the principles of effective change management to work. Information about the planned change should be open and honest. The information should not paint over-optimistic speculations or unrealistic expectations. Information dissemination should be efficient and comprehensive to everyone and employees must not let “the grapevine” take over. The honesty about the information must also outline the consequences of the choices people make. People should be given time to express their views, concerns and provide re-assurance and this might involve making time for informal discussion and feedback.

Change management involves activities which define and instil new values, attitudes, norms and behaviours within an organisation and support new ways of doing work and aim to overcome resistance to change. The principle is in the emphasis of building consensus amongst customers and stakeholders on specific changes designed to better meet their needs. The objective of the change management process is to ensure that changes are implemented with minimum or acceptable levels of risk and that other organisational processes are not jeopardised by the planned changes (Gaudet, 2005:1). This means that there is always a need to manage change in a way that is appropriate to the business concerned. This is in line with total quality management principles which call for continuous improvement while listening and learning from customers and employees. The implementation of Cardinal Rules of Safety had to follow the change management principles in order for them to produce the desired outcome.

Different models of change management have been developed and embraced in the literature on this subject. John Kotter (1995) developed the eight steps to successful change which can be widely used in different change

interventions. Change management principles according to John Kotter are outlined by the following:

- Involve and mobilise support from employees within the organisation at all times
- The change agent or management team must understand where the organisation is currently. This will help the change agents understand different people dynamics and possible reactions within the organisation when implementing the Cardinal Rules (of Safety).
- The organisation or management must understand where it wants to be, by when, why and what measures will be used to get it there. This is important to understand because everyone within the organisation has fundamental needs that have to be met which might not be aligned to the "bigger picture".
- Set up strategic action plans to achieve the above with appropriate achievable & measurable stages. Expectations need to be managed realistically so clear strategic action plans will act as a road map towards the intended objective/s.
- Lastly the change agent must communicate, involve, enable and facilitate involvement from people as early and openly as possible. Fears have to be addressed and dealt with decisively and the above will curb the possibility of employees fearing for their jobs.

2.8.1. Conclusion

Because all organisations possess a unique bundle of resources and processes, individual competitive advantage, culture, diversity and operating in different environment, they cannot use one and the same change management strategy. Every strategy should be customised to fit the organisation in question. Management failure to make employees see the value of adhering to safety rules will result in lack of buy-in and poor support and inevitably the benefits of the proposed change will not be realised.

2.9. SUMMARY

- Organisational culture is closely related to organisational strategy. If new strategies are incompatible with the kind of culture prevailing at that time, then chances are they might fail. Any particular form of organisational culture is affected by the way employees, employers and shareholders communicate with each other, and business culture can be an enemy to organisational changes.
- Because of the uniqueness of organizations, it is still a challenge to have common causes/influences of good safety culture in all organizations. The environment in which people work and the systems and processes in an organisation also influence the safety culture.
- Establishing and developing a positive safety culture is cost effective, increases productivity and efficiency and also improves the organization's "bottom line" and image.
- There are many factors that influence safety behaviour at work which can be attributed to individual differences. In order to understand why individuals behave in a certain way in certain circumstances, it is important to understand what factors influence such behaviour.
- It is therefore imperative for the organization to periodically examine any evidence of groupthink. This will assist in making efforts to diversify the teams which seem to have the groupthink effect before it plagues the whole organization. This will help in rooting out unwanted culture and behaviour within the organization.
- Change management and principles of managing change emphasise that change must be well managed, it must also be planned, organised, directed, and controlled. Implementation of the cardinal rules of safety was no exception to the change processes. Change management process must not ignore the people side of change management lest the change initiative will fail
- Because all organisations possess a unique bundle of resources and processes, individual competitive advantage, culture, diversity and operating in different environments they cannot use one and the same

change strategy. Every strategy should be customised to fit the organisation in question

- Even though most change initiatives are logical and sound, management sometimes forgets to align the change management process with the organisational structures, culture, resources, roles and responsibilities leading to process failure.
- Workers behaviour towards safety cannot be separated from safety incidents in the workplace.

Chapter 3

Empirical study

3.1. INTRODUCTION

The purpose of this chapter is to present the results of the empirical study, in context with the research objectives and design, and in relation to the broader problem statement. The discussion will therefore contain the choice and composition of the research objectives, research design, study population, measuring instruments, approach to the scoring and the interpretation of the measuring instrument, as well as the statistical analysis. The discussion also contains the various methodological issues and considerations regarding the gathering of the data.

3.2. OBJECTIVES OF THE EMPIRICAL STUDY

The objective of this study is to determine the impact of cardinal rules on employee safety behaviour at Power Stations in Mpumalanga.

The empirical objectives of the study are to determine:

- Training and supervision within an organisation
- Involvement of employees and management in developing safe work procedures
- The role of management commitment in enforcing safety culture
- The impact of safety behaviour on overall safety performance

3.3. GATHERING OF DATA

This section presents a thorough explanation of the various methodological issues and considerations regarding obtaining and handling the data used in the study. The section consists of two parts, each representing a different

component of the data collection gathering process. The first part contains information regarding the development and construction of the questionnaire and the second part contains information regarding the data collection.

3.3.1. Development and construction of questionnaire

The questionnaire was developed from a literature review done on the impact of cardinal rules of safety at Power Stations. It contains questions and items relevant to the initial research problem. Some of the information used to develop the survey instrument used in the study was a standard questionnaire developed by Dominic Cooper (1998) and WorkCover's Manufacturing Industry Reference Group. Questions or items of the same kind or that seek the same kind of information, are categorised together. Information regarding the questionnaire will be entered by the respondents.

Layout of the analytical categories relevant to the research problem and literature review is as follows:

Section A: Personal information
Power Station
Gender
Age
Employment status
Academic qualifications
Years of service at a Power Station
Past work experience before working in the Power Station
Years having been authorised

Section B: Training and supervision
Section C: Safe work procedures
Section D: Management commitment
Section E: Behavioural safety

In Section A the respondents had to indicate the applicable answer by marking the designated block with a cross. In Sections B, C, D and E, a five point Likert scale was used to measure responses that range from “strongly disagree” with a value of one, to “strongly agree” with a value of five. The Likert scale gives a consistent measure of the actual position on the continuum, instead of indicating only whether the respondent was favourably inclined on an issue or not.

3.3.2. Data collection

Printed copies of the questionnaire were distributed to 90 employees working at three different Power Stations as the convenience sampling method applied. The technique used to distribute the questionnaire includes personal delivery to participants and delivery through their managers and supervisors. The aim was to distribute the questionnaire and receive them back from the respondents the same day they were handed out. The strategy used was to visit the Power Stations on days where the target population were having their main meetings and will be in one boardroom. Questionnaires will be handed to the respondents at the end of the meeting so that they can complete them on the spot. The demographical area was Majuba Power Station, Tutuka Power Station and Grootvlei Power Station. A period of three days was used to collect all the completed questionnaires, a day was spent at each Power Station and almost all distributed questionnaires were returned at the end of each day.

A total of 87 usable questionnaires were returned from the sample, which constitutes a response rate of 96.7%. The main reasons for non-returns during the process were the limited time available for respondents to complete the questionnaires and busy work schedules and unavailability of some of the Authorised Persons.

Statistical analysis was performed by the Statistical Consulting Services of the North West University using SPSS

3.4. Biographical information of the respondents

3.4.1. Name of Power Station where respondents work

- **Purpose of the question**

The purpose of question A1, in Section A of the questionnaire (refer to Appendix A) was to determine the Power Station where the respondents work.

- **Results obtained**

Demographics of The Power Stations where all respondents work are presented in table 3.1 below.

Table 3.1: Place of work of respondents

Place of work	Frequency	Valid Percent
Grootvlei Power Station	28	32.2%
Majuba Power Station	28	32.2%
Tutuka Power Station	31	35.6%
Total	87	100.0%

Table 3.1 indicates that 31 (35.6%) of the respondents are from Tutuka Power Station and the balance are equal at 28 (32.2%), from both Grootvlei and Majuba Power Stations.

3.4.2. Gender of respondents

- **Purpose of the question**

The purpose of question A2, in Section A of the questionnaire (refer to Appendix A) was to determine the gender of respondents.

- **Results obtained**

The gender of all employees that responded to the survey is presented in table 3.2 below.

Table 3.2: Gender of respondents

Gender	Frequency	Valid Percent
Male	71	81.6%
Female	16	18.4%
Total	87	100.0%

Table 3.2 indicates that more than three quarters, that is 71 (81.6%) of the respondents are males and 16 (18.4%) of the respondents are females.

3.4.3. Age group classification of respondents

- **Purpose of the question**

The purpose of question A3, in Section A of the questionnaire (refer to Appendix A) was to determine the age group category of respondents.

- **Results obtained**

The age groups of all employees that responded to the survey are presented in Table 3.3 below.

Table 3.3: Age group of respondents

Age group	Frequency	Valid Percent
20 to 29 years old	27	31.0%
30 to 39 years old	28	32.2%
40 to 49 years old	18	20.7%
50 to 59 years old	12	13.8%
60+ years old	2	2.3%
Total	87	100.0%

Table 3.3 above indicates that the biggest categories in this review are represented by the 20 to 29 year age group (31.0%) and the 30 to 39 year age group (32.2%) which constitutes almost two thirds of the respondents.
The remainder of the groups constitutes 36.8% of the respondents where only 2.3% represents 60 years and older respondents.

3.4.4. Employment status of respondents

- **Purpose of the question**

The purpose of question A4, in Section A of the questionnaire (refer to Appendix A) was to determine the employment status of respondents.

- **Results obtained**

The employment status of all employees that responded to the survey is presented in Table 3.4 below.

Table 3.4: Employment status

Employment status	Frequency	Valid Percent
Permanent (Eskom)	45	51.7%
Permanent (Subsidiary)	6	6.9%
Consultants	0	0.0%
Contractor	36	41.4%
Total	87	100.0%

Table 3.4 above indicates that the highest number of respondents were Eskom permanent employees, that is 45 (51.7%) of the respondents followed by contractors at 36 (41.4%) of the respondents. The lowest was from Eskom subsidiary at 6 (6.9%) respondents. None of the respondents were consultants to Eskom as indicated on the table above.

3.4.5. Highest academic qualification of respondents

- **Purpose of the question**

The purpose of question A5, in Section A of the questionnaire (refer to Appendix A) was to determine the academic qualifications of respondents.

- **Results obtained**

The academic qualifications of all employees that responded to the survey are presented in Table 3.5 below.

Table 3.5: Academic qualification

Academic qualification	Frequency	Valid Percent
Lower than matric (grade 12)	5	5.8%
Matric (grade 12)	14	16.3%
Certificate	30	34.9%
Diploma (Technical College or University of technology	33	38.4%
University degree	4	4.7%
Total	86	100.0%
Missing	1	

Table 3.5 above indicates that the biggest categories in this review are represented by the respondents with diplomas which had 33 (38.4%) respondents, followed by respondents with certificates at 30 (34.9%). Respondents with diploma and certificates constitute more than two thirds (73.3%) of the total respondents to the survey. There are 14 (16.3%) respondents with grade 12 and only 4 (4.7%) of the respondents had University degrees. Five (5.8%) respondents had not obtained Matric.

3.4.6. Number of years for respondents working at Eskom Power Station

- **Purpose of the question**

The purpose of question A6, in Section A of the questionnaire (refer to Appendix A) was to determine the number of years the respondents have worked at Eskom Power Stations.

- **Results obtained**

The number of years working at Eskom Power Stations of all employees that responded to the survey are presented in Table 3.6 below.

Table 3.6: Number of years working at Eskom

Years working at Eskom	Frequency	Valid Percent
Three years or less than three (3) years	17	19.5%
Four (4) years	25	28.7%
Five (5) years	10	11.5%
Six (6) years	4	4.6%
Seven (7) years	2	2.3%
Eight (8) years and more	29	33.3%
Total	87	100.0%

Table 3.6 above indicates that the majority of respondents have been working for Eskom for four years (28.7%) and those that are eight years and more (33.3%). There is a gap between respondents with 8 years and 5 years since only 6 of the respondents had 6 to 7 years of experience which constitutes only 6.9% of the respondents.

3.4.7. Respondents' past experience before working for Eskom Power Stations

- **Purpose of the question**

The purpose of question A7, in Section A of the questionnaire (refer to Appendix A) was to determine the respondents' past experience before working at a Power Station.

- **Results obtained**

The past experience of all respondents to the survey before working at a Power Station is presented in Table 3.7 below.

Table 3.7: Past experience before working for Eskom

Past experience	Frequency	Valid Percent
Studying	24	29.3%
Unemployment	6	7.3%
Working	49	59.8%
Self-employed	3	3.7%
Total	82	100.0%
Missing	5	

Table 3.7 above indicates that the majority of respondents were employed prior to starting their employment with Eskom (59.8%). This is followed by respondents that are working at the Power Station coming from University (29.3%) and the rest were either unemployed (7.3%) or self-employed (3.7%) and 5 missing.

3.4.8. Respondents' number of years authorised as Responsible Person

- **Purpose of the question**

The purpose of question A8, in Section A of the questionnaire (refer to Appendix A) was to determine the number of year the respondents have been authorised as Responsible Persons.

- **Results obtained**

The number of years of authorisation as a Responsible Person of all employees that responded to the survey is presented in Table 3.8 below.

Table 3.8: Number of years authorised as responsible person

Years authorised as responsible person	Frequency	Valid Percent
Less than one (1) year	19	21.8%
1-3 years	32	36.8%
4-5 years	10	11.5%
6-10 years	9	10.3%
More than ten (10) years	17	19.5%
Total	87	100.0%

Table 3.8 above indicated that about half of the respondents (51 or 58.6% have been authorised for 3 years or less. The table above also indicates that there are respondents who have been authorised as Responsible Persons for more than 10 years (19.5%). Between the years 6-10 of being authorised as a Responsible Person, only 9 respondents (10.3%) and 10 respondents (11.5%) are between 4-5 years.

3.5. Response sheet for section B, C, D and E (refer to appendix A)

Table 3. 9: Response sheet

Question	Description - refer to appendix for full description of the question	Valid percentage (Frequency)					Missing	Mean	Std. Deviation
		Strongly disagree	Disagree	Don't know	Agree	Strongly agree			
QB1	Safety induction offered when starting work at Eskom	1.1	0.0	1.1	21.8	75.9	0	4.71	0.608
QB2	Safety induction compulsory at Eskom	0.0	0.0	0.0	12.6	87.4	0	4.87	0.334
QB3	Trained on safe work procedures for specific job	4.6	4.6	5.7	46.0	39.1	0	4.10	1.023
QB4	Safe work procedure training compulsory	2.3	1.1	13.8	29.9	51.7	1	4.29	0.919
QB5	Manager/Supervisor make sure work can be done safe	0.0	2.4	3.4	35.6	56.3	1	4.47	0.731
QB6	Manager/Supervisor checks that work is done safe	0.0	11.5	9.2	41.4	37.9	0	4.06	0.969
QB7	Awareness about safety issues	0.0	1.1	2.3	32.2	64.4	0	4.60	0.600
QB8	Enough time is granted to learn cardinal rules	0.0	2.3	3.4	34.5	59.8	1	4.52	0.680

QC1	Safety risk jobs identified in work area	0.0	6.9	4.6	41.4	46.0	1	4.28	0.849
QC2	Company has task based safety procedures for safety risk areas	1.1	2.3	5.7	42.5	46.0	2	4.33	0.793
QC3	workers involves is reviewing sake woke procedures	3.4	13.8	6.9	46.0	27.6	2	3.82	1.104
QC4	workers involved in compiling cardinal rules	17.2	11.5	35.6	13.8	20.7	1	3.09	1.343
QC5	Workers follow work procedures per cardinal rules	0.0	2.3	10.3	48.3	36.0	2	4.22	0.730
QC6	review and update of safe work procedure	1.1	10.3	17.2	40.2	29.9	1	3.88	0.999
QC7	Risk assessment done before performing any task	0.0	3.4	2.3	29.9	63.2	1	4.55	0.714
QD1	Managers understand what we all should do regarding safety	0.0	6.9	11.5	55.2	24.1	2	3.99	0.809
QD2	Managers enforces cardinal rules of safety	0.0	2.3	2.3	42.5	51.7	1	4.45	0.663
QD3	Management commits enough safety resources	1.1	12.6	10.3	50.6	23.0	2	3.84	0.974
QD4	Cardinal rules of safety are communicated as high priority	0.0	1.1	3.4	40.2	54.0	1	4.49	0.628
QD5A	Management respond quick on safety related issues	3.4	10.3	11.5	42.5	31.0	1	3.88	1.078
QD5B	Managers gets involved on safety issues	0.0	3.4	10.3	51.7	32.2	2	4.15	0.748
QD6	Manager/Supervisor mean what they say in safety	3.4	5.7	12.6	43.7	31.0	3	3.96	1.011
QD7	Managers/Supervisor do what they say in safety	3.4	6.9	14.9	31.0	19.5	21	3.74	1.086
QE1	Commitment from top management towards safety	0.0	5.7	10.3	57.5	25.3	1	4.03	0.774
QE2	Feel safe doing work when adhering to safety	0.0	1.1	2.3	46.0	48.3	2	4.45	0.608
QE3	Place of work from safety hazards	4.6	12.6	6.9	59.8	13.8	2	3.67	1.028
QE4	I am provided with high equipment to execute task safely	3.4	10.3	2.3	52.9	29.9	1	3.97	1.034
QE5	Level of stress in my job acceptable	8.0	19.5	16.1	46.0	9.2	1	3.29	1.136
QE6	Safety metters are communicated effectively	2.3	4.6	4.6	56.3	31.0	1	4.10	0.868
QE7	Safety related information is available	1.1	1.1	9.2	57.5	29.9	1	4.15	0.728
QE8	feedback on reported safety concerns given	3.4	9.2	14.9	55.2	14.9	2	3.71	0.961
QE9	adequate human resource for management of safety	5.7	14.9	19.5	42.5	16.1	1	3.49	1.114
QE10	Feel that cardinal rules of safety not taken serious	18.4	36.8	6.9	23.0	13.8	1	2.77	1.369
QE11	I feel I was letting the team down by not following safety instruction	1.1	4.6	3.4	54.0	33.3	3	4.18	0.809
QE12	I feel my safety is taken serious in the company	2.3	4.6	8.0	52.9	31.0	1	4.07	0.892
QE13	I think about consequence of violating cardinal rules when performing tasks	1.1	4.6	3.4	37.9	51.7	1	4.36	0.853
QE14	Cardinal rules makes doing my job difficult	29.9	39.1	4.6	19.5	5.7	1	2.31	1.258

3.6. RESULTS

3.6.1. Background on analytics

The aim of doing analytics is to get the idea of why we see the variation in the response. This is achieved by using the numerical values representing the chances, likelihood or possibility a particular event will occur. In this way the evaluation of statistical significance becomes possible. From table 3.9 above, the result will determine if what is seen is just coincident or the population also shows the correlation or difference between the measured variables. If the p-value of ≤ 0.05 (Statistical significance) is achieved, we say there is 95% chance of seeing correlation or difference in the population. The effective size will tell us if the difference or correlation have an impact in reality or is practically significant.

The p-values are used to generalise results based on random sample however since there is no random sample the researcher cannot generalise and will therefore report the p-value but not for the purpose of generalising to some large population. Focus is therefore placed on practical significance. Ellis and steyn (2007: 51) concluded that statistical significance test have a tendency to yield small p-values (indicating significance) as the size of the data sets increase. The effect size is independent of sample size and is a measure of practical significance.

3.7. RELIABILITY

The reliability was tested for each section (section B, C, D and E) using Cronbach's alpha reliability coefficient

3.7.1. Training and supervision

To measure the training and supervision given by the organisation as a means of enforcing safety culture with the organisation.,would include

induction given to employees before they start work at Eskom and an on-going awareness given by management on safety related matters.

3.7.2. Safe work procedures

To measure the organisation's commitment in identifying safety risks task and putting safety procedures for task based activities which have safety risks. This section also seeks to test the involvement of employees in developing and adhering to safe work procedures.

3.7.3. Management commitment

To measure management commitment and attitude towards safety and how they respond to safety related issues raised by employees. This section also measures how serious is management/ supervisors on safety matters.

3.7.4. Behavioural safety

To measure the behaviours and culture of employees and management towards safety. This also measures the perceptions which employees have towards safety and how it affects them in performing their daily tasks.

Table 3.10: Reliability

Name of construct	Description of construct	Mean	Std deviation	Cronbach's alph	Question in construct
Training and supervision	To measure the training and supervision given by the organisation as a means of enforcing safety culture for employees	4.452	0.4794	0.784	B1 to B8
Safe work procedures	To measure the involvement of employees in developing and adherence to safe work	4.025	0.6591	0.818	C1 to C7

	procedures				
Management commitment	To measure management commitment and attitude towards safety and how they respond to safety related issues raised by employees	4.069	0.6392	0.874	D1 to D7
Behavioural safety	To measure the behaviour and culture of employees and management towards safety. This also measures the perceptions which employees have towards safety	3.753	0.4609	0.726	E1 to E14

3.8. DETERMINING THE STRENGTH OF THE RELATIONSHIP AMONGST VARIABLES (CORRELATION)

Table 3.11 below indicates the positive correlation between two variables. The table will be discussed in detail. Spearman's rho was used to determine the strength of the relationship amongst variable.

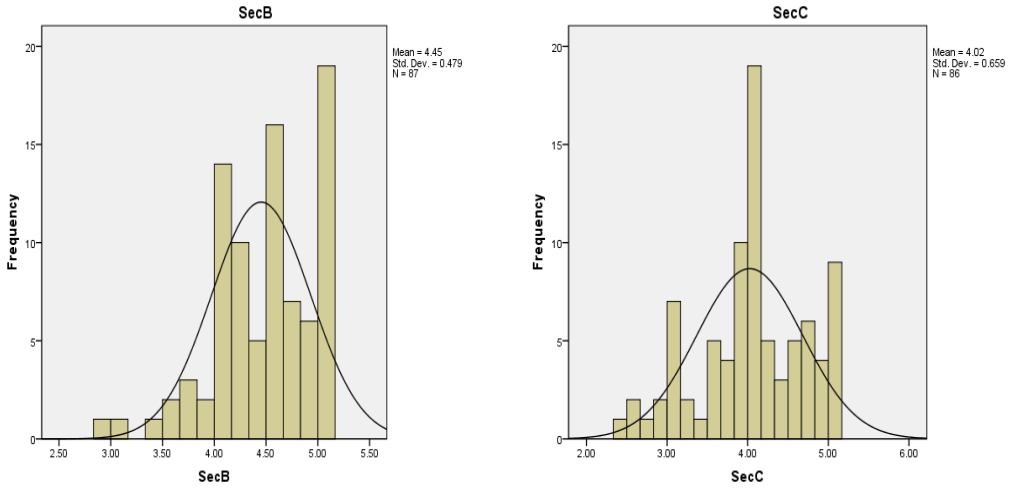
Table 3.11: Strength relationship

Comparison (refer to appendix A for full description)	p-value	r-value
Training and supervision vs Safe work procedures	0.000001	0.654
Training and supervision vs management commitment	0.001	0.358
Training and supervision vs behavioural safety	0.000001	0.462
safe work procedures vs management commitment	0.000001	0.535
safe work procedures vs management commitment	0.000001	0.543
Management commitment vs behavioural safety	0.000001	0.702

3.8.1. Correlation discussion

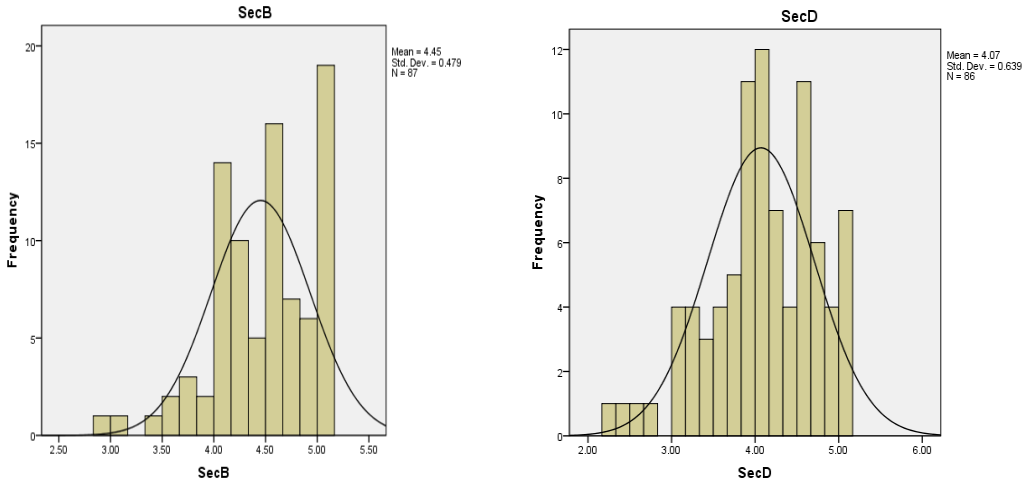
3.8.1.1. Training and supervision vs safe work procedures

There is practical significance in the association between section B and Section C. Respondents who felt that training and supervision is done also felt that the existence of safe work procedures is enforced.



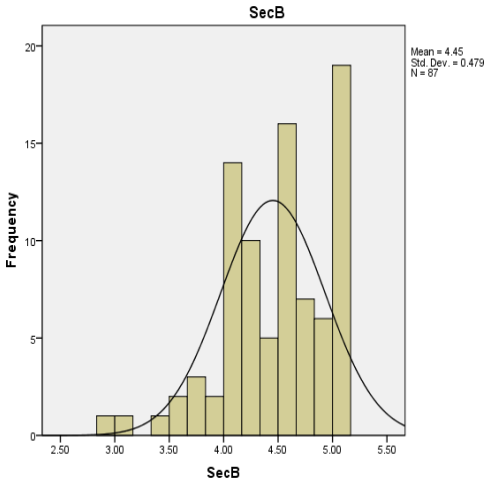
3.8.1.2. training and supervision vs management commitment

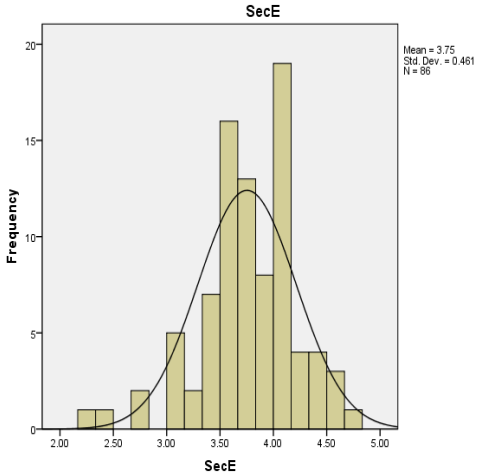
There is practically visible association between section B and Section D. Respondents who felt that training and supervision is done also felt that there is management commitment towards safety.



3.8.1.3. Training and supervision vs behavioural safety

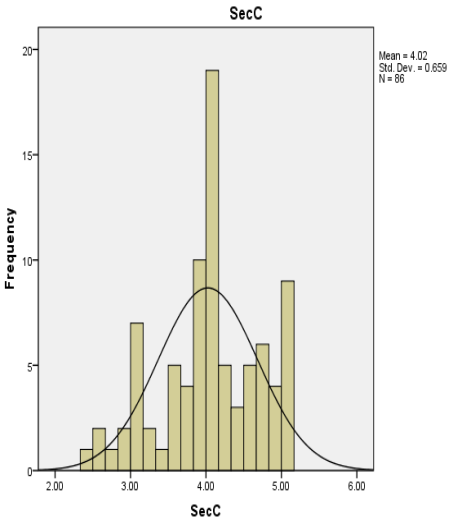
For all practical reasons, there is a practically visible association between section B and Section E. Some of the respondents who felt that training and supervision is done also somehow felt that safety behaviour is enforced in improving on safety.

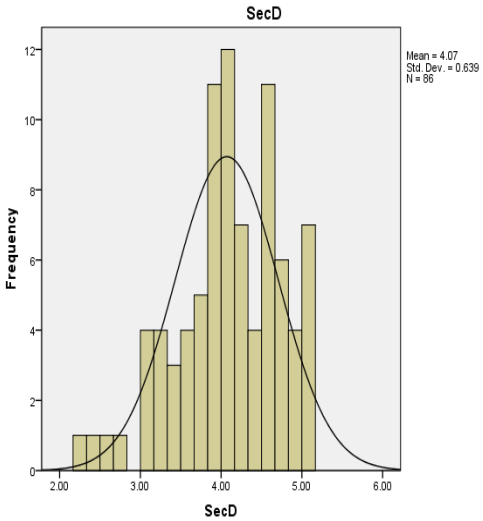




3.8.1.4. Safe work procedures vs management commitment

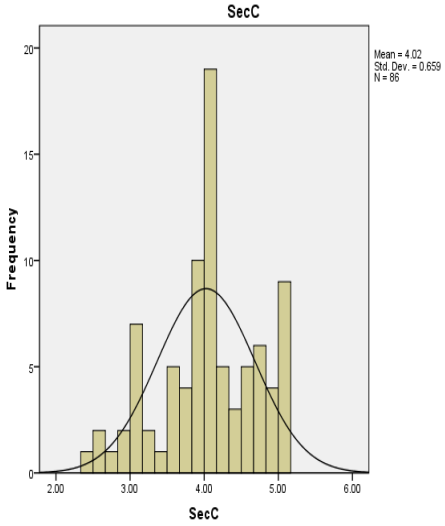
There is practical significance in the association between section C and Section D. Respondents who felt that safe work procedures are implemented also felt that there is management commitment towards enforcing safety.

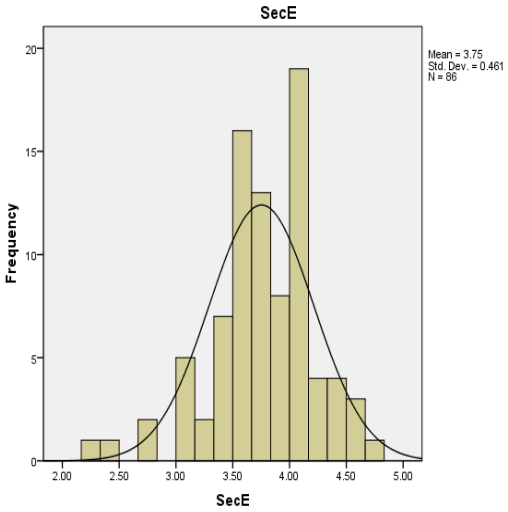




3.8.1.5. Safe work procedures vs behavioural safety

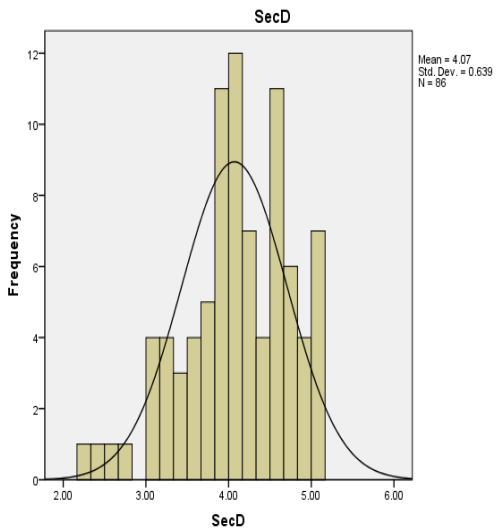
There is practical significance in the association between section C and Section D. Respondents who felt that safe work procedures are implemented also felt that safety behaviour does enforce safety.

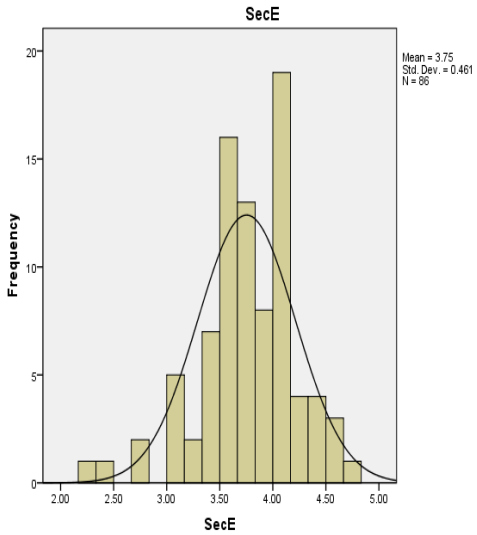




3.8.1.6. Management commitment vs behavioural safety

There is practical significance in the association between section C and Section D. Respondents who felt that management is committed to enforcing safety also felt that they have positive safety behaviour.





3.9. COMPARING RESPONSES TO FACTORS DEPENDING ON EMPLOYMENT STATUS USING INDEPENDENT SAMPLES T-TEST AND THE NON-PARAMETRIC VERSION OF THE MANN-WHITNEY

Due to the low number of respondents in the two groups of question A4 which are permanent (subsidiary) and the consultant, the respondents were re-grouped into permanent with code (1) and contractors with code (2).

Table 3.12: Comparison for response to factors depending on employment status

Section	Factor	Employment status	N	Mean	Std deviation	p-value		d-value
						t-test	Mann-Witney	Effect size
B	Training and supervision	Permanent	51	4.36	0.476	0.035	0.024	0.458
		Contractor	36	4.58	0.46			
C	Safe work procedures	Permanent	51	3.88	0.588	0.022	0.008	0.479
		Contractor	35	4.23	0.711			
D	Management commitment	Permanent	51	3.93	0.651	0.013	0.018	0.517
		Contractor	35	4.27	0.573			
E	Behavioral safety	Permanent	51	3.66	0.442	0.023	0.014	0.503
		Contractor	35	3.89	0.459			

3.9.1. Interpretation of the comparison (refer to table 3.12)

There is an almost practically visible difference between the avarage responses to section B of the permanently employed respondents versus the contractors.

There is a practically visible difference between the avarage responses to section C of the permanently employed respondents versus the contractors.

There is a practically visible difference between the avarage responses to section D of the permanently employed respondents versus the contractors.

There is an almost practically visible difference between the avarage responses to section E of the permanently employed respondents versus the contractors.

3.10. DISCUSSIONS

The study was undertaken to determine the impact of Cardinal Rules of Safety on employee behaviour at Power Stations by using a survey questionnaire. Results obtained confirm that relationship does exist between training and supervision, safe work procedures, management commitment and behavioural safety. These relationships also proved to be medium at a d-value of 0.458 to large at a value of 0.517. In line with the stronger relationship that was observed in this study, the relationship between training and supervision, management commitment and behavioural safety is practically visible. The relationship between the training and supervision, management commitment and behavioural safety is practically significant.

3.11. SUMMARY

In this chapter the methodology as well as consideration with regard to gathering the data was discussed. The results of the research were discussed and reported. The reliability coefficient and descriptive statistics of the measuring instruments were reported. The correlations and practical significance between training and supervision, safe work procedures, management commitment and behavioural safety were provided. The research findings have shown that a practically significant relationship does exist between the above variables.

In conclusion, the empirical study objectives and hypothesis have been answered. In the next chapter conclusive remarks will be made regarding the literature findings and results of the empirical study. The limitations of this research will be discussed and recommendations for the organisation will be proposed. Future research will be proposed as well.

CHAPTER 4

CONCLUSIONS AND RECOMMENDATIONS

4.1. INTRODUCTION

Geller (2001: 42) argued that the basic principle of human nature re-inforced throughout our lives runs counter to the safety efforts of individuals, groups, organisations, and communities. Geller further states that human nature explains why promoting safety and health is the most difficult and on-going challenge at work. Organisational performance is influenced by individuals and therefore, the alignment of employees to the organisational values and goals are essential for any organisation to achieve any level of success.

The purpose of this chapter is to conclude the theoretical and empirical objective of the study. The limitations of the research are emphasised and recommendations are made to the Power Station in which the research took place as well as for future research. The shortcomings of the research will be discussed and conclusions will be formulated, including future research suggestions and concluding with a summary.

4.2. CONCLUSIONS

The results of “employee safety behaviour at Power Stations” survey were discussed in chapter 3. In this chapter, the focus will be on the conclusions made on these findings of the literature and the results of the empirical research.

4.2.1. Biographical information results

Almost the same amount of responses received from the respondents at the three Power Stations where the survey was conducted. A total of 87

employees participated with a split of 81.6% males and 18.4% females. The age group of most respondents ranges from 20 to 39 years old (55%). A total of 51.7% of the respondents indicated their employment status as permanent, representing 45 maintenance employees. Since the survey was conducted involving 87 employees, it is concluded that the remainder of the numbers was conducted on contractor employees. The majority of the respondents that are authorised have been authorised for at least three years based on the analysis of the results.

4.2.2. Training and supervision

The mean value for training and supervision is 4.452 (refer to table 3.10). It is therefore concluded by the researcher that the the majority of the respondents did receive training on Cardinal Rules of Safety and there is supervision while performing their work.

4.2.3. Safe work procedures

Competence is a vital ingredient of safety behaviour because it relates to necessary skills for successful and safe task completion (Cox *et al*: 214). Safe work procedures do assist in making sure that tasks are executed safely, more especially for newly appointed and less experienced employees.

4.2.4. Management commitment

To prevent accidents to people and damage to plant and the environment, one needs to ask how management should be involved. Safety control within the organisation is partly through structure, partly through management and management systems (Cox *et al*: 104). Management commitment into enforcing safety rules is vital to excellent safety performance. It is therefore concluded that respondents observe management commitment towards making a safer workplace.

4.2.5. Behavioural safety

Geller (2001) argues that safety is actually a continuous fight with human nature. Ralf Waldo Emerson once said “What lies behind us and what lies before us are small matters compared to what lies within us”. In summary it means that we need to fight our human nature in order to address the behavioural issues towards harnessing safety conformance

4.3. LIMITATIONS OF THE RESEARCH

The following limitations were identified in this study and should be acknowledged.

- The entire population which is affected by the Cardinal Rules of Safety could not complete the survey questionnaire. This was because the rules do not affect the entire organisation equally and only those that are affected by all cardinal rules and are authorised as Responsible Persons in terms of the Eskom Plant Safety Regulations were sampled. The total population in this study was about 580; however, only 90 questionnaires were handed out and 87 returned. Only a few questions in the 87 that were returned were not answered or missing as indicated in the response sheet in chapter 3.
- The response results cannot be generalised to any other business unit in Eskom since different sourcing strategies are employed in running maintenance. Some business units have outsourced about 90% of their maintenance whilst some are using permanent staff.
- The study population was too small. Eskom has about 35 000 employees who are all subjected to Cardinal Rules of Safety.
- Not all factors that can contribute to the impact on safety behaviour were taken into consideration.

4.4. RECOMMENDATIONS

4.4.1. Recommendations for the organisation

Based on the findings of this study and the challenges of safety management it is important that the organisations pro-actively develop strategies to improve and sustain the level of perceived difficulty that is brought by the implementation of Cardinal Rules of Safety. It is the opinion of the researcher that this will influence employees' negative perception on cardinal rules.

Based on the findings, the results confirmed that a strong relationship exists between training and supervision, safe work procedures, management commitment and behavioural safety. These relationships also proved to be medium and large respectively but the organisation still needs to develop strong awareness strategies on the benefits of complying and consequences of not adhering to Cardinal Rules of Safety. Behavioural scientists have found that negative consequences can permanently suppress behaviour if the punishment is severe, certain and immediate (Geller: 148)

Managers and supervisors are central to the success of behaviour-based safety and they are required to display more transformational leadership skills such as coaching, mentoring, engaging and facilitating their teams. Therefore managers and supervisors need to be enabled by supplying them with tools and skills to manage all deviations pro-actively since they have a general duty to ensure, as far as reasonably practicable, the health, safety and welfare at work of all their employees.

4.4.2. Future research

Geller argued that behaviour does not occur in a vacuum. Most people perform the way they do because they expect to achieve certain and positive consequences or they expect to avoid soon, certain and negative consequences. People take calculated risks because they expect to gain something positive or avoid something negative. Therefore future research

would be to determine why people resist opportunities for actively caring for safety. Then we can develop interventions to increase the desired behaviour which is critical for achieving a total safety culture in the workplace.

4.5. CONCLUSION

The results of the study indicates that training and supervision, safe work procedures, management commitment and behavioural safety are significant predictors of the impact of cardinal rules of safety on employee behaviour at Power Stations. However there is still much to research on the observed traits and this warrants consideration for future research.

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Appendix A: Questionnaire

QUESTIONNAIRE:
IMPACT OF CARDINAL RULES ON EMPLOYEES SAFETY BEHAVIOR AT POWER STATIONS IN MPUMALANGA

PLEASE NOTE:
This questionnaire must only be completed by Eskom employees working at Power Stations in Mpumalanga

All information will be treated as **STRICTLY CONFIDENTIAL** and will only be used for academic purposes.

Instructions for completion

1. Please answer the questions as objectively and honestly as possible.
2. Place a cross (x) in the space provided at each question which reflects your answer the most accurately. Use the following key: **1** = Strongly disagree; **2** = Disagree; **3** = Slightly disagree; **4** = Neutral view; **5** = Slightly agree.

		Strongly disagree	**Disagree**	**Neutral view**	**Agree**	**Strongly agree**
B7	Safety officers are playing a major role in enforcing adherence to cardinal rules of safety	**1**	**2**	**3**	**4**	**X**

It is essential you indicate your choice clearly with a **pen**.

3. Please answer all the questions, as this will provide more information for this research so that an accurate analysis and interpretation of data can be made.

Thank you for your co-operation. We hope that you will find the questionnaire interesting and stimulating.

QUESTIONNAIRE DEVELOPED BY:

Mr. Tinyiko Lourence Chauke
Tel: (017) 779 8743
Email: lourence.chauke@eskom.co.za

SECTION A: PERSONAL INFORMATION

The following information is needed to help with the statistical analysis of the data for comparisons among different groups of employees. All your responses will be treated confidentially. Your help in providing this important information is appreciated.

Mark the applicable block with a cross (X).

A1	**Power Station where you work**	Groovlei	Majuba	Tutuka
		(01)	(02)	(03)

A2	**Gender**	Male	Female
		(01)	(02)

A3	**In which age group do you fall?**	20 - 29	30 - 39	40 - 49	50 - 59	60+
		(01)	(02)	(03)	(04)	(05)

A4	**What is your employment status?**	Permanent (Eskom)	Permanent (Subsidiary)	Consultant	Contractor
		(01)	(02)	(03)	(04)

A5	**Indicate your highest academic qualification.**		
	Lower than matric (grade 12)		(01)
	Matric (grade 12)		(02)
	Certificate		(03)
	Diploma (Technical College or University of Technology)		(04)
	University degree		(05)

A6	**Indicate the number of years working at Eskom power station.**		
	Three years or less than three (3) years		(01)
	Four (4) years		(02)
	Five (5) years		(03)
	Six (6) years		(04)
	Seven (7) years		(05)
	Eight (8) years and more		(06)

A7	Indicate your past experience before working at an Eskom Power Station		
	Studying		(01)
	Unemployed		(02)
	Working		(03)
	Self-employed		(04)

A8	Indicate the number of years that you have been authorised as the Responsible Person.		
	Less than one (1) year		(01)
	1 –3 years		(02)
	4 – 5 years		(03)
	6 – 10 years		(04)
	More than 10 years.		(05)

Indicate to what extent you agree or disagree with the following statements. Mark the applicable block with a cross (X) for all the statements below.

SECTION B: Training and supervision

		Strongly disagree	Disagree	Don't know	Agree	Strongly agree
B1	I received safety induction training when I started working at Eskom	**1**	**2**	**3**	**4**	**5**
B2	Safety Induction training is compulsory when you start work at Eskom	**1**	**2**	**3**	**4**	**5**
B3	I was trained on safe work procedures for my specific job	**1**	**2**	**3**	**4**	**5**
B4	Training on safe work procedure is compulsory at Eskom	**1**	**2**	**3**	**4**	**5**
B5	My manager/supervisor makes sure that I can do the work safely	**1**	**2**	**3**	**4**	**5**
B6	My manager/supervisor checks if I can do my job safely.	**1**	**2**	**3**	**4**	**5**
B7	I am made aware of safety issues	**1**	**2**	**3**	**4**	**5**
B8	We have enough time to learn our Cardinal Rules of Safety	**1**	**2**	**3**	**4**	**5**

SECTION C: Safe work procedures

		Strongly disagree	Disagree	Don't know	Agree	Strongly agree
C1	Our company has identified jobs in my area that have safety risks	**1**	**2**	**3**	**4**	**5**
C2	Our company has safety procedures for task-based activities in my area that have safety risks	**1**	**2**	**3**	**4**	**5**
C3	Workers are involved in reviewing safe work procedures	**1**	**2**	**3**	**4**	**5**
C4	Workers were involved in compiling the Cardinal Rules of Safety	**1**	**2**	**3**	**4**	**5**
C5	Workers follow safe work procedures as stipulated by the Cardinal Rules of Safety	**1**	**2**	**3**	**4**	**5**
C6	Our company reviews and updates our safe work procedures regularly for alignment to the Cardinal Rules of Safety	**1**	**2**	**3**	**4**	**5**
C7	Workers do a risk assessment before performing any task	**1**	**2**	**3**	**4**	**5**

SECTION D: Management commitment

		Strongly disagree	Disagree	Don't know	Agree	Strongly agree
D1	Managers seem to understand what we (employees) and they (management) should do regarding safety	**1**	**2**	**3**	**4**	**5**
D2	Management enforces Cardinal Rules of Safety	**1**	**2**	**3**	**4**	**5**
D3	Management commits enough safety resources in the workplace	**1**	**2**	**3**	**4**	**5**
D4	Management communicate Cardinal Rules of Safety as a high priority in our Business Unit	**1**	**2**	**3**	**4**	**5**
D5	Management respond quickly on safety related issues	**1**	**2**	**3**	**4**	**5**
D5	Management gets involved in safety issues	**1**	**2**	**3**	**4**	**5**
D6	Managers/supervisors mean what they say in safety matters	**1**	**2**	**3**	**4**	**5**
D7	Managers/supervisors do what they say in safety matters					

SECTION E: Behavioural Safety

		Strongly disagree	Disagree	Don't Know	Agree	Strongly agree
E1	I feel there is commitment from top management towards my safety	**1**	**2**	**3**	**4**	**5**
E2	I feel safe doing my job when I adhere to Cardinal Rules of Safety	**1**	**2**	**3**	**4**	**5**
E3	I feel my place of work is safe from safety hazards	**1**	**2**	**3**	**4**	**5**
E4	I am provided with the right equipment to do my job safely	**1**	**2**	**3**	**4**	**5**
E5	I feel the level of stress in my job is acceptable	**1**	**2**	**3**	**4**	**5**
E6	I feel safety matters are communicated effectively	**1**	**2**	**3**	**4**	**5**
E7	There is information available relating to safety	**1**	**2**	**3**	**4**	**5**
E8	If I report a safety concern I will get feedback	**1**	**2**	**3**	**4**	**5**
E9	There is adequate human resources in place for management of safety	**1**	**2**	**3**	**4**	**5**
E10	I feel that Cardinal Rules of Safety are not taken seriously	**1**	**2**	**3**	**4**	**5**
E11	If I did not follow a safety instruction, I feel like I was letting the team down	**1**	**2**	**3**	**4**	**5**
E12	I feel like my safety is taken seriously in this Business Unit	**1**	**2**	**3**	**4**	**5**
E13	I think about the consequences of violating Cardinal Rules of Safety every time I perform a task	**1**	**2**	**3**	**4**	**5**
E14	Cardinal Rules of Safety makes doing my job more difficult	**1**	**2**	**3**	**4**	**5**

THANK YOU FOR YOUR TIME.