EMPLOYEE PERCEPTIONS OF OCCUPATIONAL HEALTH AND SAFETY STANDARDS IN THE STEEL INDUSTRY

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─Abstract ─

The inability to follow occupational health and safety standards typically results in accidents that place severe financial burdens on both employees as well as organisations. The aim of this study is to explore the perceptions of employees in the steel industry towards occupational health and safety standards in the steel industry in South Africa. A survey was conducted in which a structured questionnaire was distributed to a purposive sample of 165 employees employed by a large steel processing company in Gauteng Province. The collected data were analysed using SPSS (Version 22.0). A combination of descriptive statistics and analysis of mean scores was applied to meet the aim of the study. The results reveal that employees in the steel industry perceived that occupational health and safety standards were satisfactory in all seven occupational health and safety dimensions considered in this study. These are (1) information and training, (2) health and safety awareness, (3) employee behaviour (4) role of the supervisor, (5) health and safety reporting mechanisms, (6) workplace inspection, and (7) workplace environment. Among these dimensions, safety awareness emerged as the most important dimension to employees. The results may be utilised by managers in the steel industry to identify and direct their attention to the key occupational health and safety factors in their different contexts.

Key Words: *Steel industry, occupational health and safety (OHS), health and safety awareness, employee behaviour, workplace inspection, workplace environment.*

JEL Classification: L2

1. INTRODUCTION

The majority of employees worldwide spend at least a third of their life in the workplace and sustain the economic and material basis of society through their income taxes. However, every year thousands of working hours are lost due to occupational accidents. According to global estimates, job related accidents and illness account for more than two million lives annually, while about 337 million accidents and 160 million illnesses occur per year (Pillay, 2014). In monetary terms, the cost of industrial accidents is exorbitantly high as it is estimated that millions of occupational accidents occurring every year worldwide result in many lost working hours, which disrupts the productivity level in the workplace (Sloane *et al.,* 2013). The International Labour Organisation (ILO) estimates that USD1.25 trillion is lost yearly through compensation, disruption of production and medical expenses associated with occupational health and safety (OHS) (Reid *et al.,* 2014). This has devastating consequences for the employer's balance sheet as well as reductions in the GDP of world economies (Shalini 2009). These amounts include wages and productivity losses, administrative, and medical costs (Parboteech & Kapp, 2008; Mearns *et al.,* 2009).

In South Africa, employees enjoy a constitutional right to a safe working environment through the Occupational Health and Safety Act No: 85 of 1993 (OHSA), which aims at supplementing the rights of employees. OHSA states that every employer must implement and maintain, as far as reasonably practicable, a work environment that is safe and without risk to the health of employees (Gagno *et al.,* 2013). The primary focus of the law is to protect the health and safety of persons at work or any other persons who are working with plant and machinery (Kopel, 2009). Apart from the OHSA, several other legislative landmarks were put in place. For instance, the Compensation for Occupational Injuries and Diseases Act 61 of 1997, was enacted to establish a state run compensation fund based on employer contributions to enable employees who are injured and disabled due to workplace injuries and diseases to be compensated from the fund (Venter *et al.,* 2011). The Basic Conditions of Employment Act 75 of 1997 gives effect to the right of employees to fair labour practice and basic conditions of employment, which includes the prevention of occupational injuries or diseases in the workplace (Rautenbach & Malherbe, 2009). The Labour Relations Act No 55 of 1996 seeks to advance economic development and social justice by promoting compliance with health and safety regulations (Finnemore & Van Rensburg,

2002). Thus, employees working in South Africa enjoy sufficient legislative support for health and safety imperatives in the workplace.

Despite the existence of the above stated laws, however, it has emerged that South Africa is not an exception and the picture is quite grim when it comes to high incidents of accidents due to non-adherence to health and safety regulations. Historically, an incident which stands out is the Kinross Mpumalanga mine disaster that occurred on 16 September 1986, which resulted in 177 miners dying due to inhalation of lethal fumes (Ramotlhodi, 2014). In January 2005, 17 employees were severely injured in the Natref Sasolburg incident (Department of Labour 2005). In 2007, an explosion took place at Sasol Secunda and claimed the lives of 10 employees when 100 employees were injured while performing their duties (Matthew, 2008). In 2013, it was estimated that about 122 889 employees experienced occupational accidents and illnesses as they executed their duties, (1%) which is equivalent to 884 employees who die due to workplace accidents (Huess & Hedlund, 2013). Moreover, numerous cases of respiratory diseases borne out of long term exposure to toxic gases as well as the spread of other diseases, such as tuberculosis, silicosis, noise induced hearing loss, and exposure to eyesight threatening rays have been reported, albeit with inconsistent statistics (Pollitt, 2011). In the steel manufacturing sector, the handling of heavy equipment, hazardous chemicals and molten metal are routine activities for employees. The working environment in that sector is also notorious for high temperature and high emission of harmful gases. This poses huge injury and health risks to employees in this industry. The adverse effects associated with occupational accidents and diseases are notable. A 1997 study conducted by the Department of Labour estimated the financial costs of industrial incidents and diseases in 1996 to be around 17 billion rand, which equates to 3.5 percent of the national Gross Domestic Product (Department of Labour, 2008). However, by 2012 this figure had escalated to a massive R30 billion rand per annum (Govindjee, 2012). Employers have also experienced a high incidence of damage to property, increased cases of absenteeism, loss of skills and reduced organisational productivity (Ali, Abdullah & Subramaniam, 2009). The wage bills of employers escalate because they spend more on insurance pay-outs, hospital stays, as well as the costs of engaging and retraining replacements of injured or dead employees. By 2010, the South African government was spending over 50 billion rand on the compensation fund to compensate the injured and the families of the deceased (Kinoti, 2010). At an individual level, families are left devastated

through either the injury or death of their bread winners, with obvious negative consequences downstream. Individuals who are exposed to workplace accidents or diseases also experience both physical and psychological harm that may affect them for the duration of their lives (Nel *et al.,* 2008). It is clear then that minimising accidents and injuries in the workplace should be the responsibility of all stakeholders in order to avert these adverse effects.

2. PROBLEM STATEMENT

The aim of this paper is to investigate employee perceptions of OHS in the South African steel industry. As noted by Edwards, Davey and Armstrong (2014), there is a paucity of empirically derived information on the effectiveness of the South African government's initiatives regarding the promotion of health and safety regulations in the steel manufacturing sector. The presence of this gap is surprising, given that the steel manufacturing industry in South Africa is one of those industries where there exists a serious concern about health and safety (Sibanyoni, 2015). This provides adequate ground to launch further investigations with the intent to address this research gap.

Edington and Schultz (2008) argue that OHS is priceless since it is virtually impossible and unethical to assign a price tag on an employee's health and safety. Bosak *et al. (*2013) mention that non-adherence to health and safety regulations continues to be major challenge for steel companies worldwide. Pillay (2014) adds that approximately 250 million occupational accidents occur annually, accompanied by at least 330,000 fatalities. Reducing occupational diseases and accidents in South Africa would not only improve and save employees lives, but would reduce the astronomical monetary pay-outs made annually by the office of the Compensation Commissioner to victims of work related accidents (Germiniani & Smallwood, 2008). Since South Africa is currently experiencing a shortage of critical skills, the retention of presently available manpower through adherence to OHS standards is imperative. It becomes important then to investigate OHS issues in order to generate information that can be used by relevant management practitioners in both government and the steel industry to promote adherence to OHS standards.

3. RESEARCH METHODOLOGY

To gain a deeper understanding of the perceptions of employees towards OHS standards in the steel industry, a quantitative approach was followed. A total of 165 employees from a large steel processing multinational company based in the southern region of Gauteng Province in South Africa were recruited to participate in the study. Respondents were selected using the non-probability purposive sampling technique, which entails the selection of population cases that are rich in information regarding the questions to be considered (Teddie & Tashakkori 2009). After obtaining permission to conduct the study from management, a survey was conducted in January 2015.

A survey questionnaire was constructed and used as the research instrument in the data collection. The questionnaire was partitioned into nine sections. Section A focused on voluntary participation, which provided respondents with a chance to sign as a way of indicating their voluntary participation in the study. Section-B requested the biographical profile of the respondents, while Section C elicited information on OHS information and training. Section D focused on measuring respondents' OHS awareness, Section E on employee behaviour, Section F on the role of supervisors, Section G on reporting mechanisms, Section H on workplace safety inspection and Section I on the workplace environment. Ethical issues, such as informed consent, voluntary participation, and participant confidentiality were adhered to during the collection of data (Clough & Nutbrown, 2012). The collected data were analysed using descriptive statistics with the aid of the Statistical Packages for the Social Sciences (SPSS version 22.0).

4. RESULTS OF THE STUDY

4.1 Biographical details of respondents

Section B of the questionnaire sought biographical information in terms of gender, race, age group, work experience, occupational level and type of employment contract. In terms of gender, there were more male respondents (70.9 %; n=117) compared to female respondents (29.1%; n=48). With respect to race, the majority of respondents were African (76.4%; n=165), followed by Whites (21.2%; n=35). With reference to age groups, a majority of the employees fell within the 18 to 28 year age group (44.2%; n=73). This was followed by individuals in the 29 to40 year age group (40.6%; n=67). With regard to work experience, most of the

respondents (37, 6%; n=62) possessed less than four years of work experience, closely followed by those with between 5 and 10 years' of experience (32, 7 %; n=54). Concerning occupational levels of respondents, 23% (n=38) were employed as technicians, 21.1% (n=35) were in-service training graduates, 19.4% (n=32) were artisans, 13.9% (n=23) were junior engineers, 13.3% (n=22) were supervisors, and 7.9% (n=13) were experienced specialists. With regards to employment contract, the majority of respondents (75, 8%; n=125), were in permanent employment.

4.2 Analyses of mean-scores

Perceptions of respondents regarding OHS standards were assessed using analyses of mean scores. Seven dimensions, namely (1) information and training, (2) safety awareness, (3) employee behaviour (4) role of the supervisor, (5) health and safety reporting mechanisms, (6) workplace safety inspection, and (7) workplace environment were considered.

4.2.1 Perceptions regarding information and training provided by the employer

Table 1 provides the mean scores of the seven questionnaire items that assessed the perceptions of employees towards information and training in OHS as provided by the employer.

Table 1: Mean score analysis on information and training in health and safety

Items	Description of items	N	Min	Max	Mean
C1	My employer usually informs me to take precautions to protect myself when I perform my duties.	165	1	2	4.41
C2	My employer usually provides new employees with health and safety training.	165	1	5	4.40
C3	Employer trained me about the correct use of Personal Protective Equipment (**PPE).**	165	1	5	4.42
C4	My employer regularly informs me about Standard Operating Procedure (SOP) when it comes to performing my task.	165	1	5	4.21
C5	My employer provides regular refresher training on health and safety.	165	1	5	4.23
C6	My employer trained me to recognize hazards at work.	165	1	5	4.32

C7	Training has changed my behaviour about how I view health and safety.	165	1	5	4.27
Overall Scale		165	1	5	3.78
Scale denotation: Likert scale: 1= Strongly disagree to 5= Strongly agree					

The mean scores on information and training of employees on OHS ranged from $\bar{x}$ =4.04 to $\bar{x}$ =4.40. The overall mean score for the scale was $\bar{x}$ =3.78, which demonstrates an inclination towards the 'agree' point on the Likert scale. This result indicates that employees were adequately provided with information and training on OHS by their employer. Employee health and safety training ($\bar{x}$ =4.42) and provision of health and safety induction and instructions ($\bar{x}$ =4.40), training on the proper usage of personal protective equipment ($\bar{x}$ =4.42) and behavioural change regarding health and safety ($\bar{x}$ =4.27) seem to be sufficiently addressed by the employer. As mentioned by Scheeres *et al.* (2010), the sharing of information and the provision of safety training are amongst the most powerful tools that employers can utilise in the workplace to stimulate adherence to health and safety standards. Thus, how one receives such information as well as the quality of safety training in the workplace impacts on the ability to follow OHS standards.

4.2.2 Perceptions regarding employee safety awareness

Table 2 provides the mean scores of the nine questionnaire items that assessed employees' safety awareness in the organisation.

Table 2: Mean score analysis of employee safety awareness

Items	Description of items	N	Min	Max	Mean
D1	I have sufficient knowledge of the Occupational Health and Safety Act.	165	1	5	4.19
D2	We have a copy of the OHSA on the employer's premises.	165	1	5	4.40
D3	I know my rights as an employee when it comes to health and safety issues	165	1	5	4.22
D4	We are provided with the necessary skills as employees in the organisation to perform our work safely.	165	1	5	4.36
D5	I usually follow safety procedures at work.	165	1	5	4.30
D6	We have a health and safety representative in my workplace	165	1	5	4.09
D6	All employees are involved in the planning of health and safety	165	1	5	4.31

D7	Employee awareness to OHSA will lead to a reduction of accidents	165	1	5	4.35
D8	Safety meetings are held regularly with employees.	165	1	5	4.36
D9	Safety awareness campaigns are held on a regular basis.	165	1	5	4.26
Overall Scale		165	1	5	4.76
Scale denotation: Likert scale: 1= Strongly disagree to 5= Strongly agree					

The level of employee safety awareness is critical when addressing safety adherence. The mean scores for the employee awareness scale ranged from $\bar{x}$ =4.09 to $\bar{x}$ =4.40. The overall mean score for the scale was $\bar{x}$ =4.76, which represents a strong inclination towards the 'strongly agree' position on the Likert scale. These high mean scores demonstrate that employees possessed the necessary skills in terms of safety awareness in the workplace. Furthermore, employees seem to have sufficient knowledge and understanding of the OHS Act. This was attributed to the fact that health and safety campaigns are held regularly, which led to a reduction of accidents. The mean score for safety campaigns was high at $\bar{x}$ =4.26. Safety campaigns play a prominent role as they serve as a reminder that employees should strive to minimise and prevent occupational accidents. This is supported by research by Nunez and Villanueva (2011) who affirmed that there is direct relationship between safety knowledge as well as safety awareness and lower occurrence of occupational accidents.

4.2.3 Perceptions regarding employee behaviour

Table 3 provides an overview of the behaviour of employees with regard to OHS.

Table 3: Mean score analysis of employee behaviour

Items	Description of items	N	Min	Max	Mean
E1	I usually follow safety procedures when doing my job.	165	1	5	4.35
E2	I prefer to spend more time on a task to ensure it is done safely; rather than rushing to complete a task.	165	1	5	4.32
E3	Employees sometimes ignore safety procedures.	165	1	5	3.93
E4	Some employees get away with unsafe conduct in the work place.	165	1	5	3.90
E5	Performing my work safely has become a habit for me rather than a challenge.	165	1	5	4.27

E6	As an employee I am fully aware of hazards in my daily job.	165	1	5	4.36
E7	Every employee is responsible for their own safety in the organisation.	165	1	5	4.43
Overall Scale		165	1	5	4.22

Scale denotation: Likert scale: 1= Strongly disagree to 5= Strongly agree

The mean scores for employee behaviour with regard to safety issues ranged from $\bar{x}$ = 3.90 to $\bar{x}$ = 4.43. The overall mean score for the scale was $\bar{x}$ = 4.22, which demonstrates a leaning towards the 'agree' position on the Likert scale. By implication, employees in the steel industry seem to display appropriate behaviour in the workplace, obey safety procedures and are aware of hazards on the job. It should be noted that behaviour in the workplace directly influences the safety climate in the workplace, which in turn exerts a positive effect on the attitude of employees in the workplace (Gyeke Salminen & Ojajarvi, 2012). It is suggested then that employees in the steel industry are currently applying an effort to follow OHS standards.

4.2.4 Perceptions regarding the role of supervisors in health and safety

Table 4 provides an overview of the employee perceptions of the role of the supervisor with regard to health and safety matters.

Table 4: Mean score analysis of the role of the supervisor in health and safety

Items	Description of items	N	Min	Max	Mean
F1	My supervisor takes employees health and safety very seriously	165	1	5	4.30
F2	Supervisors perform risk assessment on a regular basis.	165	1	5	4.25
F3	Supervisors encourage employees to adhere with the OHSA.	165	1	5	4.23
F4	Supervisor listens to employee's safety concerns in the organisation.	165	1	5	4.19
Overall scale		165	1	5	4.24

Scale denotation: Likert scale: 1= Strongly disagree to 5= Strongly agree

Table 4 outlines the pivotal role played by a supervisor at workshop level. This role usually includes encouraging employees to observe and comply with OHS regulations. In this section the highest mean score is $\bar{x}$ =4.30 and the overall mean score is $\bar{x}$ = 4.24. Item F1 shows that employees agreed that their supervisors take their OHS seriously and that they play a significant role in encouraging employees to adhere with the Occupational Health and Safety Act. The mean

score for item F2 was $\bar{x}$ =4.25 which implies that employees agreed that their supervisor performed risk assessment in the workplace on a regular basis. Item F4 had the lowest mean score of $\bar{x}$ =4.19, which indicates that the supervisor listens to suggestions and concerns by employees.

4.2.5 Perceptions regarding occupational health and safety reporting mechanisms

Table 5 reports on the mean scores for the three questionnaire items focusing on health and safety reporting mechanisms.

Table 5: Mean score analysis of occupational health and safety reporting mechanisms

Items	Description of items	N	Min	Max	Mean
G1	There is a formal health and safety reporting mechanism in the company.	165	1	5	4.36
G2	Reported health and safety issues are attended to promptly	165	1	5	4.31
G3	Employees are encouraged to report accidents that occur at work.	165	1	5	4.93
Overall scale		165	1	5	4.53
Scale denotation: Likert scale: 1= Strongly disagree to 5= Strongly agree					

Table 5 provides a summary of the mean scores in terms of accidents reported in health and safety. Table 5 shows the highest mean score $\bar{x}$ =4.93 and an overall mean score of $\bar{x}$ =4.53 indicating that the company encourages employees to report all OHS issues. Item G1 shows a mean score of $\bar{x}$ =4.36, which also highlights that the company has a formal reporting procedure in place for employees to utilise in reporting workplace accidents. Item G2 had a mean score of $\bar{x}$ =4.31, which illustrates that all reported health and safety issues are attended to promptly. There is therefore an efficient and effective health and safety reporting mechanism in place at the company.

4.2.6 Perceptions regarding workplace safety inspection

Table 6 provides an overview of the mean scores of the seven questionnaire items focusing on workplace inspection.

Table 6: Mean score analysis of workplace safety inspection

Items	Description of items	N	Min	Max	Mean
H1	Safety inspections take place regularly at work.	165	1	5	4.27

H2	Regular inspections encourage the employer to comply with OHSA	165	1	5	4.38
H3	Labour inspectors are allowed access in the workplace.	165	1	5	4.16
H4	Safety signs are visible for everyone to see	165	1	5	4.36
H5	Inspectors impose fines and penalties when the employer is non-compliant.	165	1	5	4.20
H6	Risk assessment is regularly carried out on the employer's premises by SHE representatives.	165	1	5	4.18
Overall scale		165	1	5	4.26
Scale denotation: Likert scale: 1= Strongly disagree to 5= Strongly agree					

The mean scores relating to workplace inspection ranged from $\bar{x}$ =4.16 to $\bar{x}$ =4.38. The overall mean score for the scale was $\bar{x}$ =4.26, which represents a disposition towards the 'agree' point on the Likert scale. These scores indicate that regular health and safety inspections are conducted in accordance with the OHSA. Item H5 had a mean score of $\bar{x}$ =4.20 while item H6 had a mean score of $\bar{x}$ 4.18, indicating that inspections and risks assessments are regularly conducted at the company. Labour inspectors are also allowed to access the facility (Item H3, $\bar{x}$ =4.16) to conduct OHS inspections. Therefore, there seems to be a high compliance with OHS standards at the company, which as mentioned by some researchers (Cantor, 2008; Capriotti, 2007) ensures that the company is not in trouble with regulatory authorities and that its employees are more productive.

4.2.7 Perceptions regarding the workplace environment

Table 7 provides an overview of the mean scores for the five questionnaire items focusing on the workplace environment.

Table 7: Means analysis of workplace environment

Items	Description of items	N	Min	Max	Mean
I1	There is enough ventilation at my workstation.	165	1	5	4.19
I2	I am comfortable with the room temperature.	165	1	5	4.05
I3	I am satisfied with the level of hygiene at my workplace.	165	1	5	3.84
I4	There is sufficient lighting at my work place.	165	1	5	4.12
I5	Chemical substances are clearly marked.	165	1	5	4.24
Overall scale		165	1	5	4.09
Scale denotation: Likert scale: 1= Strongly disagree to 5= Strongly agree					

As shown in Table 7, the mean scores for the workplace environment scale ranged from $\bar{x}$ =3.84 to $\bar{x}$ =4.24. The overall mean score for the entire scale was $\bar{x}$ =4.09, which shows that majority of employees concurred that their workplace

environment met the required health and safety standards. Item I5 reported the highest mean score of $\bar{x}$ =4.24 indicating that employees agreed that chemical substances are clearly marked when inspections are conducted. Employees also agreed that there was sufficient ventilation $\bar{x}$ =4.19 to prevent the spread of hazardous chemicals within the workplace and appropriate measures are applied. Issues such as room temperature ($\bar{x}$ =4.05), hygiene ($\bar{x}$ =3.84) and lighting ($\bar{x}$ =4.12) were also reported to be satisfactory. Hence, the workplace environment at the steel processing company is of a high standard in terms of meeting OHS standards.

4.3 Validity and reliability

In order to ascertain content-related validity, the measuring instrument was assessed by two senior academics who are experts in the field of OHS. In order to ascertain construct validity, 30 questionnaires were pilot tested on part-time safety management students who were employees in the steel processing sector. In order to check the reliability of the questionnaire, the Cronbach alpha coefficient was utilised, with the expectation that alpha values above 0.7 would be taken as indicators of acceptable reliability (Feinberg *et al.*, 2013). The alpha values of all scales ranged between 0.752 and 0.933, which confirmed that scale reliability was satisfactory in this study.

5. CONCLUSIONS AND RECOMMENDATIONS

The aim of this study is to investigate perceptions of employees in the steel processing industry regarding OHS standards. There is a high level of adherence to OHS standards in the steel industry in South Africa in seven dimensions considered, which are (1) information and training (2) safety awareness, (3) employee behaviour (4) role of the supervisor, (5) health and safety reporting mechanisms, (6) workplace safety inspection, and (7) workplace environment. Adherence to safety awareness standards is perceived as being stronger when compared to the other six dimensions.

Based on the conclusions drawn above, several recommendations for the improvement of OHS standards in the steel industry are put forward. More resources should be channelled towards health and safety training to further strengthen health and safety adherence. Training should focus on hazard identification and risk assessments, which may offer organisations long term

benefits, which will potentially lead to a reduction in occupational accidents, injuries and illnesses. Training programmes that focus specifically on improving the OHS related behaviours of employees should be designed and implemented to boost psychological aspects that are critical in improving observance of OHS standards amongst employees in the steel industry. In addition, bonuses/rewards could be offered to employees in various departments/divisions that excel in observing OHS standards. Efforts must be made to ensure that all important stakeholders such as management, employees, labour unions, customers, government, among others become a united force in promoting OHS standards in the steel industry. Management must also be proactive and not reactive by acting only when accidents take place, such that health and safety matters should be a priority on their agenda.

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