

Effect of Occupational Safety and Health Training on Performance of Cement Manufacturing Firms in Kenya

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Abstract

Aim: This study sought to establish the effect of Occupational Safety and Health (OSH) training on occupational accidents on performance of cement manufacturing firms in Kenya. The study further sought to examine the moderating effect of management support on the relationship between employee training on occupational accidents and performance of cement manufacturing firms in Kenya.

Methods: The study was informed by entropy model and human factor theory. The study adopted the descriptive research design which used both quantitative and qualitative approach to determine the relationship between employee training and performance of cement manufacturing firms in Kenya. The unit of analysis was the six cement manufacturing firms in Kenya while the unit of observation was five cement manufacturing firms. Stratified random sampling was used to obtain the sample size of 344 respondents drawn from human resource management, production department and marketing department.

Results: The study established that occupational safety and health training had a significant and positive effect on performance of cement manufacturing firms in Kenya. The study also established that management support had significant moderating effect on the relationship between occupational accidents and performance of cement manufacturing firms in Kenya.

Conclusion: OSH training on occupational accidents had a positive and significant effect on the performance of cement manufacturing firms in Kenya. Through continued OSH training there was drastic decline in the number of accidents at the work place which was associated with straining of resources and low productivity.

Recommendation: The study recommend that manufacturing firms should implement control measures which include safety videos, audios, regular OSH training and pamphlets on safety among others. The stakeholders should ensure regular inspection of safety control measures. The government should ensure timely review of safety policies by organizations and compliance to Occupational Safety and Health Administration (OSHA) Act (2007) Laws of Kenya.

Keywords: *Occupational accidents, occupational safety and health training, firm performance, management style, cement manufacturing firms.*

1.0 INTRODUCTION

1.1 Background of the Study

An occupational accident according to the World Health Organization (WHO) is the unplanned event that mostly results in personal injuries with the equipment and machines taking the knock or as well ceasing production for some time. In a world where economic growth of most of the countries is tied to manufacturing and related activities, it goes without saying that occupational accidents are the order of the day. These accidents are known to massively affect the performance of the employees which translates to declined performance of the entire sector. According to Bratton and Gold (2017), the cost of occupational accidents can be as high as 37% of associated profits and 5% of operating costs. Indirect costs include overtime payments necessary to make up for lost production, cost of retaining a replacement employee, a wage cost for the time spent by Human Resource Management (HRM) personnel, recruiting, selecting and training the new employees, loss of revenue through cancelled orders, court hearings if necessary (Gopang et al., 2017).

As occupational accidents in the working environment keep increasing, the measures taken by the organizations especially manufacturing firms to curb these accidents remain a significant way to enhance employee productivity. Some accidents however may be severe than others thus calling for different measures to handle them. Training of workers is made initially to impart knowledge and further compel the trainees to act on and implement gained knowledge (Ferrett, 2015). This will include hands-on training and passive learning where hands-on training enables the workers to acquire skills that they can implement daily at their workplace.

Training employees on the occupational accidents and how to prevent the occurrence and severity of the accidents is a major move to steer organizational performance through promoting an active and productive workforce. Previous evidence upholds that when training the employees on accidents, it is appropriate to focus on the causes of the accidents through which they are avoided/ prevented (Jacob, Joseph & Rengaraj, 2014). All organizations are under the Occupational Safety and Health Administration (OSHA) Act which was created within the Department of Labour in Kenya to encourage employers and employees reduce work place hazards and to implement new or improve existing health and safety programmes. Frequency of accidents should also be emphasized when training the employees on occupational accidents. Through teaching workers on how to handle emergencies like having first-aid training or through workshops, workers would be able to appreciate and get prepared to handle incidents and accidents at the job place (Mckinnon, 2012). Safety training was expected to have an influence on accidents in an organization (Lekusye, 2016). The research focused on how OSH training affects the overall handling of occupational accidents in order to determine whether the training has an effect on the performance of cement manufacturing firms in Kenya.

In a normal workplace, exposure hazards may include Chemicals and other hazardous materials, excessive noise and vibrations, temperature extremes, biohazards including those that are normally occurring (such as mold) and manmade (such as anthrax) ergonomic hazards (such as poorly designed equipment that forces workers to do their jobs while contorted in unnatural positions) and the more familiar related hazards such as slippery floors and blocked passageways. One of the major causes of occupational accidents according to Dessler (2008) is employee resistance. While employees have a responsibility to comply with OSHA Standards, they often resist and in most cases the employer remains liable for any penalties.

Manufacturing in Kenya is one of the major sectors upheld for contribution in economic and development. The sector comprises of several subsectors and one of them is the cement manufacturing. The cement manufacturing sub-sector comprises of companies that deal with production, packaging and distribution of cement and other related products (Musyoka, 2014). In a country where construction and infrastructural development is at its peak as it is in Kenya, cement is one of the major input materials (Gopal & Rajendra, 2012). This is an indication that the performance of the cement manufacturing firms could significantly contribute to the infrastructural development and economic growth as well.

According to the WHO, cement manufacturing is one of the manufacturing activities that have the highest health effect on workers. Cement manufacturing is not only associated with diseases such as asthma but also accidents due to the implication of heavy machinery and equipment involved in the entire process (Dyer & Blair, 2012). This therefore means that occupational accidents are a norm in the cement manufacturing industry hence the call for increased training of employees on the health-related issues in the sub-sector (Asfaw, Argaw, & Bayissa, 2015). This study sought to find out the effect of occupational safety and health training on performance of cement manufacturing firms in Kenya.

1.2 Statement of the Problem

It is estimated that over 160 million cases of work-related diseases and sicknesses are reported every year with the newest report by the WHO showing that close to 2.5 million people die every year as a result of work-related sicknesses. In Kenya, the manufacturing sector is rated to be one of the sectors with the highest number of occupational accidents (Charles, Joel, & Samwel, 2012). Studies have cited poor working conditions, lack of awareness on occupational safety and poor management of workforce as the major causes of occupational accidents. Manufacturing firms in Kenya lose billions of shillings every year as a result of absenteeism, decreased productivity among injured employees, treatment costs and poor commitment due to fear to obtain injuries (Makori et al., 2012). Statistics show that training on occupational accidents prevents over 40% of the occupational accident. However, it remains unclear on the role played by this training on performance of cement manufacturing firms. This study therefore sought to fill the existing gap by establishing the effect of occupational safety and health training on performance of cement manufacturing firms in Kenya.

1.3 Objectives of the Study

The study aimed to achieve the following specific objectives:

1. To determine how OSH training on occupational accidents affects performance of cement manufacturing firms in Kenya.
2. To examine the moderating effect of management support on the relationship between occupational safety and health training and performance of cement manufacturing firms in Kenya.

1.4 Research Hypotheses

1. H_{a1} : There is no effect of OSH training on occupational accidents on Performance of cement manufacturing firms in Kenya.
2. H_{a2} : There is no significant moderating effect of management support on the relationship between OSH training and performance of cement manufacturing firms in Kenya.

2.0 LITERATURE REVIEW

2.1 Theoretical Framework

2.1.1 Entropy model of accident causation

The entropy model developed by Mol (2003) encompasses the safety of operations and productivity of staff together. This model accounts for incorporation of risks, prevention and ensuring safety of workers in a bid to enhance productivity (Mol, 2014). This model asserts that risks are concepts that are linked to negative outcomes like loss, damage and regrets.

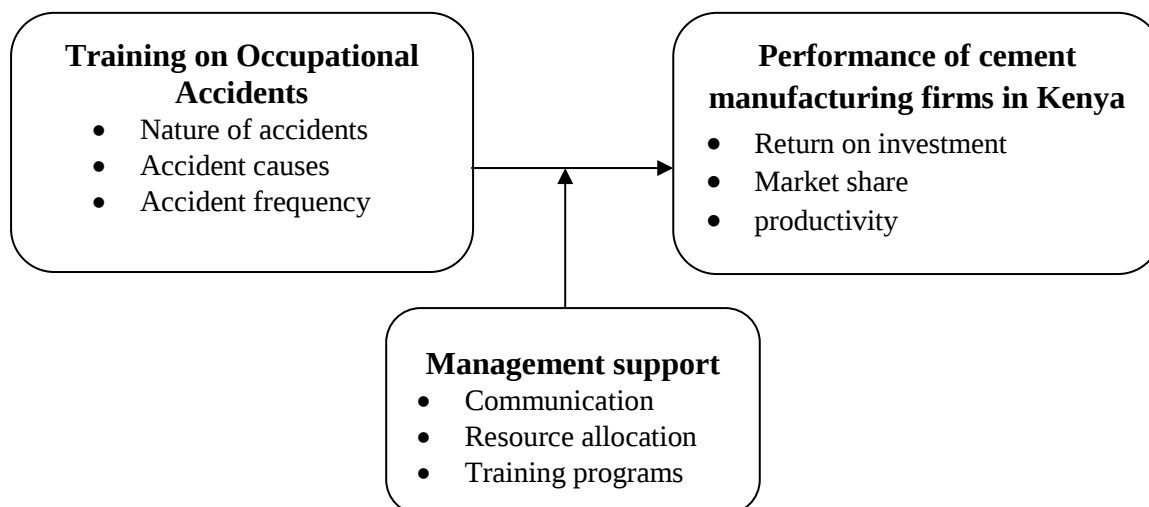
The presence of OSH management helps alleviate presence of occupational accidents that have capacity to cause harmful consequences like personal injuries and/or property damage. The model asserts that the right steps to eliminating occupational accidents included identifying risks; in this case two categories of risks including entropic and residual risks. The entropic risk is associated with the degradation of the business operations/systems while the residual risks are associated with all firms' organizational activities (Zhao et al., 2016).

The entropy model provides a strategy that enables organizations to manage and eliminate occupational hazards (Geller & Veazie, 2014). The four-fold strategy suggested by the entropy model entails taking immediate corrective action to eliminating both residual and entropic risks; establishing strategies that prevent future entropic risks; handling all potential residual risks in the short term and minimizing all potential residual risks in long term. The model closes with suggestions and questions that focus on education/training of the staff about the residual risks, vigilance on the residual risks and acquiring of adequate knowledge about risk management through safety training and adherence to the set rules. This theory supports the first independent variable which is training on occupational accidents.

2.1.2 Human factor theory

The human factor theory pioneered by Petersen (1984), singles out three aspects that are associated with accidents at the workplace. These include work overload, inappropriate response and inappropriate activities. These aspects push the workers to conditions that compromise their exposure to occupational hazards (Hignett et al., 2015). The aspect of overload encompasses environmental factors, internal factors of the workers and the situational factors. Organizations need to train their staff to avoid work overload and other internal factors that can expose them to accidents. The other aspects of inappropriate response focus on early detection of occupational accidents at the workplace and not correcting them. The factors associated with inappropriate activities are linked to personality and behavior of workers. The human factor theory states that focusing on training of workers and involving them in the training programmes has capacity to increase safety and minimize occupational accidents (Al-Nuseirat & Biygautane, 2014).

2.2 Conceptual Framework



Independent Variables

Moderating Variable

Dependent Variable

Figure 1: Conceptual framework

2.3 Empirical Literature Review

Khanzode, Maiti and Ray (2012) conducted a study that sought to understand the concepts of occupational injuries and accident causations. The authors indicated that for an organization to effectively reduce the rate of accidents at the workplace, systematic hazard identification of the working process was required and Intervention strategies needed to be installed at every stage of operation (Boutras et al., 2015). Accident causation models were discussed in the study with a focus on the models that apply to manufacturing firms and could reduce the frequency of accidents. Empirical research conducted by Khanzode et al. (2012) indicated that the number of accidents in an organization highlight the preparedness of handling emergencies as well as having right mechanisms for prevention of accidents.

A study by Niu (2010) focused on the International Labour Organization (ILO) perspective on the ergonomics and occupational health and safety. The ILO mandates that organizations have to protect workers against injuries, diseases and sicknesses that result from their exposure to hazards and injury-causing agents. The international standards developed by ILO aid in protecting the workers and directly helping the organization in realizing profitability.

Chi and Han's (2013) study on the analysis of the systems theory for construction prevention presented an analysis of OSH accidents in the construction industry for a period of time. The authors indicated that occupational accidents in construction industry had similar causes. The study integrated the systems theory into the Domino's theory in exploring interrelationships between risks and breaking the chain of accident causation. The study was conducted in United States covering 9358 accidents occurring in a period of ten years up to 2011. The study found out that majority of accidents are repeat accidents since they occurred from the same operation, place or even to the same category of people. The study indicated that organizations needed to establish significant risk relationships between the causes and the type of injury, severity and the part of the body affected in order to initiate appropriate mechanisms to prevent further injuries (Brauer, 2016).

Reynolds et al. (2013) focused on managing worker safety, productivity as well as regulatory issues where the authors argued that creating awareness and overseeing compliance to the set

rules is key in ensuring proper implementation. The authors indicated that organizations need to adopt an effective safety-specific transformational leadership that could help in ensuring identified programs were implemented strictly. Proper management and leadership of teams in realizing the importance of adopting OSH programs and implementing them to the latter. Appropriate management styles would address the issues of workers' health and safety as they form some of the critical assets an organization could use to achieve its goals. Visionary, innovative, responsive and flexible management is recommended for ensuring high good performance at the cement manufacturing firms in Kenya.

3.0 RESEARCH METHODOLOGY

3.1 Research Design

A descriptive research design was adopted in the study. The design uses both quantitative and qualitative methods to collect and analyze the research data. It involves measuring a set of variables as they exist naturally (Gravertter & Forzano, 2011).

3.2 Target Population

The target population for this study was six (6) licensed cement manufacturing firms in Kenya. Specifically, the study targeted the employees in human resource department, production department and marketing department as the units of observation.

3.3 Sampling

Purposive random sampling method was used to select a sample of the six cement manufacturing firms in Kenya according to the market share. The sample size was drawn from 2500 employees of the five cement manufacturing firms. The study adopted the simplified sample size formula by Yamane (1967) as follows:

$$n = \frac{N}{1 + Ne^2}$$

Where

n = Sample size

N = Target population

e = Maximum acceptable margin of error (5%).

$$n = \frac{2500}{1 + 2500(0.05)^2}$$

$$n = 344 \text{ (sample size)}$$

The total number of respondents was 344 as selected across the three departments within the five firms. This is around 14% of the total population of employees in the six licensed cement manufacturing firms in Kenya. In the second stage, stratified random sampling was used to take a stratified sample of 344 in various departments in the selected firms: those under human resource management, production department and marketing department.

3.4 Data Collection

Primary data was collected using a questionnaire that was designed with both structured and unstructured questions and an interview guide for the Human Resource and Safety/Production managers. Questionnaire was deemed appropriate to collect information in the most precarious factors related to the health and safety of employees.

3.5 Data Analysis

Descriptive and inferential methods were used to analyze data through use of Statistical Package for Social Sciences (SPSS). Multiple regression analysis was used to establish the relations between performance of cement manufacturing firms in Kenya and occupational accidents. The following regression model was used:

$$Y = \beta_0 + \beta_1 X_1 + e \quad \text{where:}$$

Y = represents the dependent variable, Firm performance β_0 = the Constant

β = the coefficient of X_i

X_1 = OSH training on occupational accident

e = error term

The study used multiple regression analysis (stepwise method) to establish the moderating effect of firm characteristics (z) on relationship between independent variables and dependent variable.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_1 Z + e$$

Where:

Y = the dependent variable, Firm performance

β_0 = the Constant

X_1 = occupational accidents

Z = the moderator (Management styles)

e = error term

4.0 RESEARCH FINDINGS AND DISCUSSION

4.1 Response Rate

The study obtained a response rate of 96% where there was a total of 330 positive responses on questionnaires out of the targeted 344. This was considered adequate for analysis and making conclusions and recommendations on the study.

4.2 Descriptive Analysis of the Study Variables

4.2.1 Occupational accidents and firm performance

The descriptive results revealed that occupational accidents were highly rated by the respondents to influence the performance of the cement manufacturing firms. The findings concur with those by Haslinda *et al.* (2016) who found that safety training, effective company policy and effective communication had an effect on the overall accident management at an organization, highlighting the possibility of a firm increasing its production. OSH training is concerned with increasing knowledge of the employees and thus motivating them to embrace safety at the workplace (Idirimanna & Jayawardena, 2011).

Table 1: Descriptive statistics on training on occupational accidents and firm performance

Case Processing Summary	Mean	Std. Dev
Through OSH training, occupational incidents/accidents have drastically reduced	3.93	0.91
The OSH training has extensively saved the organization resources	3.91	0.84
OSH training has increased my belief of safe working environment	3.79	0.94
OSH trainings make employees prepared for occupational accidents	3.93	0.91
OSH training has helped increase positive attitude in embracing workplace safety	3.91	0.84
We are always prepared to act on the knowledge gained from OSH training to avoid occupational accidents	3.79	0.94
The OSH training reminds employees of the importance of adhering to safety regulations	3.81	0.90
Through safety training the organization has reduced occupational accidents and improved productivity	3.80	0.91

4.2.2 Management styles and firm performance

The descriptive results revealed that management styles influenced the implementation of the occupational health training policies and strategies thus affecting the performance of cement manufacturing firms. The findings compare with those by Athey (2015) who established that the management styles used by the organizational management to integrate the OSH aspects in the organizational mainstream explained the level at which the aspect was embraced. Through proper communication and employees' involvement in management, the entire organizational aligns into embracing the OSH training. This make the implementation of the entire process and its contribution to firm performance viable (Reynolds et al., 2013).

Table 2: Descriptive statistics on management support and firm performance

Item	Mean	Std. Dev
Communication between senior management and other employees' impact on the number of incidents and accidents	4.13	0.76
The management involves staff/workers in planning on OSH training, selection of safety and health topics to be covered	3.79	0.94
In case of incidents and accidents, the management has well-coordinated structures that help in reducing the magnitude of damage	3.48	1.05
The management focuses on frequent OSH training on all staff	2.09	1.33
The management trains new staff on their roles and safety practices before starting working	3.86	0.96
The management rewards staff, groups and departments that show high degree of OSH preparedness and OSH practices	3.71	0.99
The management have conducive working environment for the staffs	3.94	0.98
Management of your firm through OSH training has ensured that employees feel valued	2.68	1.33

4.3 Inferential Statistics

The study sought to find out the relationship between the relationship between employee training and Performance of Cement Manufacturing firms in Kenya. The statistical relationship between the two variables was sought through regression model whereby the output was generated in terms of model summary, ANOVA and regression coefficients. The model adopted herein was of the form: $Y = \beta_0 + \beta_1 X_1 + \epsilon$. The findings on the model summary as shown in Table 3 revealed that the R^2 for the model was 0.627 an indicator that the variation of firm performance was explained by up to 62.7% by occupational accidents.

Table 3: Regression analysis for OSH training on occupational accidents

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.792 ^a	.627	.543	.121

a. Predictors: (Constant), Occupational Accidents

The study sought to find out the relationship between occupational accidents and performance of cement manufacturing firms in Kenya. The statistical relationship between the two variables was sought through regression model whereby the output was generated in terms of model summary, ANOVA and regression coefficients. The findings on the model summary as shown in Table 3 revealed that the R^2 for the model was 0.627, an indication that the variation of performance was explained by up to 62.7% by occupational accidents.

Table 4: ANOVA for occupational accidents

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2.641	1	2.641	14.872	.000 ^b
	Residual	14.561	329	.178		
	Total	17.202	330			

a. Dependent variable: Firm performance

b. Predictors: (Constant), OSH training on occupational accidents

The ANOVA results on Table 4 revealed that at F-values of 14.872, the model was significant at a significant level of $0.000 < 0.05$. This implies that the performance of the cement manufacturing firms could be explained by occupational accidents and that the model was significant to give a direction on whether to accept or fails to accept the null hypothesis.

Table 5: Regression coefficients for occupational accidents

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.886	.223		12.966	.000
	OSH training on occupational accidents	.726	.159	.792	4.566	.000

$$Y = 2.886 + 0.726X_1 + e$$

The regression coefficients shown on Table 5 on the other hand revealed that at a beta (β) coefficient of 0.726, occupational accidents significantly and positively influenced the performance of cement manufacturing firms at a significance level of 0.000. This implies that a unit change in occupational accidents leads to 72.6% increase in performance of cement manufacturing firms. This therefore gives a go-ahead to reject the null hypothesis of the study which states that occupational accidents have no significant influence on the performance of cement manufacturing companies in Kenya. Seixas et al. (2012) also supported the correlation between occupational accidents and performance of cement manufacturing firms. The study findings were also supported by McKinnon (2012) who opined that there was a strong relationship between embracing occupational accidents and performance of cement manufacturing firms.

4.3.1 Moderating effect of management support

The study sought to find out the moderating effect of management support on the relationship between occupational safety and health training and performance of cement manufacturing firms in Kenya. The results as shown in Table 6 revealed that management style had a significant moderating effect on the relationship between employee training on occupational accidents and performance of cement manufacturing firms in Kenya. This is evidenced by the P-value of $0.000 < 0.05$ and Beta (β) of 0.403. The results thereby satisfy the verdict to accept the null hypothesis that management style has a significant moderating effect on the relationship between employee training and occupational accidents on performance of cement manufacturing firms in Kenya.

Table 5: Regression coefficients (moderated model)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	3.702	.057		93.94	.000
Occupational Accident X_1 *M	.734	.089	.050	8.971	.000

a. Dependent variable: Firm performance

5.0 CONCLUSION

The study concluded that occupational safety and health training had a significant and positive effect on the performance of cement manufacturing firms in Kenya. Through continued OSH training, there was drastic decline in the number of accidents at the workplace which was associated with wasting of resources and low productivity accounted for by absenteeism and time lost due to seeking healthcare services and compensation.

Management support has a moderating effect on the relationship between employee training on occupational accidents and performance of cement manufacturing firms in Kenya. This is to imply that through the support of management and leadership adopted by the cement manufacturing firms, the implementation of various occupational health policies are enhanced thus promoting occupational safety and employee productivity.

6.0 RECOMMENDATIONS

The management of cement manufacturing firms in Kenya ought to embrace measures to prevent occupational accidents through which they reap from an effectively productive

workforce thus promoting organizational performance. Protective gear, training and support ought to be accorded to the workers as a way of steering their commitment and courage to fully perform their duties.

The management should ensure effective communication with the employees and proper involvement in any strategy through which occupational safety will be enhanced. There should be frequent and orderly training on occupational safety matters. A key aspect identified was rewarding employees and staff who embraced safety practices at their workplace. The management should also create a conducive working environment for all staff to ensure their maximum productivity. The government should ensure timely review of policies by organizations and compliance to OSHA Act Laws of Kenya.

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