

**THE EFFECT OF SHIFT DUTY ON EMPLOYEE PERFORMANCE FOR CEMENT  
MANUFACTURING FIRMS IN KENYA**

**BY**

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## DECLARATION

This management project is my original work and has not been presented for examination in any other University or college

.

Signature..... Date.....

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This research has been presented for examination with my approval as the university supervisor.

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## **DEDICATION**

To the Kitonyi family and my friends, so that they don't cease dreaming and believing in their own potentials to pursue and achieve their dreams.

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## **ABBREVIATIONS AND ACCRYONYMS**

<b>ACGME:</b>	Accreditation Council for Graduate Medical Education
<b>BARS:</b>	Behaviorally Anchored Rating Scales
<b>CCR:</b>	Central Control Room
<b>FAA:</b>	Federal Aviation Administration
<b>HDU:</b>	High dependent unit
<b>ICU:</b>	Intensive care unit
<b>MBO:</b>	Management by objectives
<b>SPSS:</b>	Statistical Package for Social Sciences

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## **ABSTRACT**

The study focused on to assess the effect of shift duty plans management on employee performance for cement manufacturing firms in Kenya. The specific objectives of the study were; to establish shift duty plans management in the cement manufacturing firms in Kenya and to establish the effect of the shift duty plans management on employee performance in the cement manufacturing firms in Kenya. Descriptive research design was used. Simple Multi stage (two stages) sampling method was used which involved stratified proportionate random sampling techniques. The finding shows that, cement manufacturing firms favor use of rotating 12-hour shift plan and fixed 12 hours shift plan as had been each observed by 42.9% of the respondents. The leading shift plan management objective was “To maximize organizations productivity” with a mean of 3.9. Further the study reveals that there is statistically significance in association between shift structure plan management and stability of production. Since, the significance value (p-value) was 0.002 which is less than 0.05 level of significance; hence p-value is less than significance.

Lastly, the results of the Pearson correlation coefficient indicate that there exists a relationship between the Shift duty and employee Performance. That result also indicates that there is a significant positive relationship between Shift duty and employee Performance. Thus, the study recommended; shift duty plan management choice should be analyzed well such that firms adopt structures that favor performance optimization and performance maximization. The government, policy makers and managers need to come up with suitable guidelines on how best to implement shift duty plan management in the manufacturing sector.

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 Background of the Study**

Shift duty work is a practice adopted all over across the world in both service and manufacturing industry with round the clock operation style for output maximization. In the core basics of shift duty, demand drives the need for expansion of production time spectrum, higher utilization of existing facilities, equipment and additional human resources. Crucial service provision such as manning of CCR rooms, ICU and HDU in hospitals, security and traffic control work stations are some of economics functions in organizations that inevitably run on shift duty.

The desire for shift duty work has grown in the modern times with respect to technological advancement and by extension, in the provision of goods and services to general populations. This in turn requiring progressive control over the work stations in a 24hour cycle. Increasing economic competition among countries, economic zones and industries due to the globalization of the market, productive strategies and labor pool has consequently driven heightened exploitation of productive systems intensively and extensively. Proliferations of 24hour economy societies globally exhibits this condition, where both consumers and producers aggressively compete for the availability of goods and services while on the other hand, making it possible for consumption and production to continue anytime of the day. Thus, diversification of working time contributes to the improvement of human life in provision of more goods and services, employment opportunities, better salaries, bonuses and overtimes among many more other benefits.

However, this isn't always the case in many work situations. Studies have shown that in the past decades some industrial worst accidents occurred in shift duty and mostly during night shifts. Accidents such as Ukraine's Chernobyl nuclear power plant disaster, USA, Pennsylvania Three Mile Island power plant, India's Bhopal gas leak disaster, Switzerland's Santoz chemical spill into Rhine River among others, are all night shift incidents. Investigations have shown that these accidents associated with human errors in shift duty by CCR operators. Kazemi (2016) found out that ability to perform mentally on functions such as memorizing facts, paying attention, processing information and response time are facets of cognitive function. Cognitive functions have great influence into performance of many tasks, hence their failure can be consequential where accuracy and speed of information synthesis is required.

In Kenya, cement industry, like elsewhere in the world, employees work in shift duty structures, but it is not clear how the management of these shifty duty structures affect the performance of the workers and in turn the performance of organization. In this industry in Kenya, employee work in 12 hours long shifts or other defined hours alternating day and night which is a major of fatigue impairment. According to Vassey at al, 2002, fatigue due to deprivation of sleep and circadian rhythm disruption are recognized substantial contributors of human errors in industrial accidents. As such, strategies for management are arranged in a way to manage the shift duty structures effectively. In United States of America, in attempt to reduce errors and incidents attributed to shift duties, procedure and policies have been laid down and implemented in the manufacturing sector. Similarly, in the same country, the Accreditation Council for Graduate Medical Education (ACGME) implemented shift duty restriction on working hour in 2003 for all ACGME-accredited residency programs. This was done following numerous incidences of

deaths on patients that was found to be contributed by medical errors in some hospital across the country. (Amis 2010).

In July 2016, Federal aviation administration (FAA) in USA disclosed seven instances of air traffic controllers sleeping during work and released new guidelines in managing their work schedules across the industry. In China, Lockley et al. (2011) established that longer shifts compared to shorter shifts especially overnight lowered employees' performance. This was visible in the outcome of survey done on the same showing that every 13 out of 20 workers to experience lower performance during overnight work (between 11 pm and 7 am). Moreover, Arnedt et al. (2005) on tests carried on driving simulator, they established that there was drastically reduced attention, reduced performance and alertness on candidates subjected to heavy rotation and compared to light rotation in manufacturing industries.

In the cement manufacturing firms in Kenya, despite employee working in day and night shift, the concern in quantification of the effects of shift duty structures management on employee performance is insufficiently studied. Therefore, this study focused on studying the effects of shift duty structures management on employee's performance for cement manufacturing firms in Kenya.

### **1.1.1 Shift Duty**

Shift work can be defined as working plan where working hours are divided into groups that cover the time required to execute a desired output or performance. Shift workers are those employees schedule to work on hours between 6pm and 7am usually in a seamless handover and rotation within working hours (Kazemi, 2016). Typically, shift puts in place outlays that groups

available working hours or a day into groups where workers in the dedicated time plans execute their duties (Chiduo 2012).

In the cement manufacturing firms in Kenya, the day is divided into two or three shifts each shift running 8- or 12-hours covering day and the night. Different employees work in each shift in a seamless handover from one shift to the other. However, shift duties structures are a concern to employee performance since employees undergo shift changeovers at times. (Haidarimoghadam et al, 2017) Research has shown that deprivation of sleep and disruption of circadian rhythms is a possible cause of reduced attention and delayed response time that can lead to increased tendency of poor judgement and errors by shift workers. The preferred shift structure in the cement manufacturing firms in Kenya are 8 hours rotating shift plan, rotating 12 hours shift plan and fixed 12 hours shift plan.

### **1.1.2 Employee Performance**

According to Veasey, (2002) performance of an employee is the as the job-related tasks expected of a worker and how well those activities are executed. Employee performance is an integral part of an organization as it can grow or fail an organization (Maseko and Manyani (2011). If employee performs poorly, then the overall performance of the organization is will be poor, profitability decreases and consequently organization growth is impaired.

Similarly, according to Lockley at.al, (2011) performance can be measured by products defects, reworks, number errors by employee, net promoter score (NPS is a number (usually between 1 and 10) which represents the willingness of a client to recommend a company's service to other potential clients) and the 360-degree feedback. Work quantity refers to work output



quantitatively of the employee. This employee performance metric is measured by units produced or number of sales made.

Maseko and Manyani (2011) also argue that employee performance is affected by any factor that reduces the mood of the employee such as stress. Khakali (2017) established that Staff performance are key factors that maintains effective and efficiency of an organizational competitiveness in market. Typically, employee performance measurement is divided into three categories; work quality, work quantity and work efficiency metrics. Work quality metrics is measures employee performance through subjective appraisal by immediate supervisor.

Work efficiency is the balance between quantity and quality. However, work efficiency is difficult to measure qualitatively or quantitatively. Lockley at.al, (2011) argue that this balance quantity and quality (efficiency) is based on time and resources (money). Thus, certain quantity needs to produce a certain output (quality).

### **1.1.3 Cement manufacturing firms in Kenya**

Kenya has a mature and well-established cement manufacturing sector with eight major players. Bamburi Cement is a subsidiary of the Lafarge-Holcim Group, with an annual installed capacity of 2.1m Tons and an additional capacity of 1Million tons in its new installation at Nairobi; National Cement, of Devki Group, has an installed capacity of 2m Tons at Athi river. East Africa Portland Cement Company has an installed capacity of 1Million Tons while Mombasa Cement and Savannah Cement have 1.5m Tons each of their installed annual capacity. Athi river mining Cement wing has 1M Tons installed capacity (Dyer& Blair Investment Bank, 2012).

Both production and consumption of cement in Kenya have both risen, based on Kenya National Bureau of Statistics (KNBS) “2015 Economic Survey”. According to this survey, production of cement rose by 16.3% in 2014 to 5.88M Tons, in comparison with 7.8% in 2013. Kenya leads in the East Africa accounting for over 50% of the total cement produced, translating to about 0.00011% of the global production (Seboru, 2013). Kenyan’s production has been steadily increasing since 2010, is expected to do even better in 2018 to a tune of 8.2 MT. Kenyan cement production has maintained an upward trend and has led in the production of cement in the region (Muiru, 2016). These companies provide livelihoods to about 7,000 in direct employment.

These employees, about half of them are shift workers carrying out duties in shift structures. Shift duty structures are practiced in the cement manufacturing firms as they are favored to operate around the clock, maximizing time utility and productivity. Manager’s design shift duty structures for employees to alternate in the shifts (day shift and night shift) covering 24 hours through out a year. In the cement manufacturing firms, the shift structure is grouped in 8-hours or 12-hours cycles implying that, employee in cyclic 8 hours or 12 hours cover in 24 hours of any day. These structures run programs or schedules which change over after every 2 days in 8-hour structure. Alternatively, in a 12hrs structure, employees work for 12hrs straight through out a week with changeover done after every 7days.

Such shift plans have been found to be associable to slow social adaptations, psychological instabilities, stress related fatigue and reduced response time. Sleep deprivation on employees cause sleepiness, reduced alertness and possibly may also lead to disorders of impaired performance on cognitive skills such as reduced concentration span, reduced reaction time, inability to learn fast and slowed ability to recall new ideas. Therefore, managers of the cement

plants must come up with sound management strategies in managing the shift duty structures to reduce the problems associated with shift duty structures on employee performance. The design of management of the structures must be put in a way that it is in line with the optimum performance of the employees (Kamau, 2015). Planning for appropriate working hours and suitable rotating shift system is a contribution to improving employee's performance and enhancing safety at work. Therefore, this study intention was to carry out an investigative survey on the effects of shift duty management on the employee performance.

## **1.2 Research Problem**

Shift duty structure in manufacturing firm has become a crucial component of growing economies in both developed and developing countries (Chiduo, 2016). As the clamor to adopt 24hour economies, shift duty structures are taunted as components in industrial set ups. They are viewed as operational management strategies that can be strengthened to enhance production maximization, increase capacity utilization and firm's performance *vis-a-vis* key performance indicators.

In Kenya, like elsewhere in the world, cement manufacturing firm's production team's work in shift duty structures where shift patterns are set in shifts cycles of 8 or 12 hours. Employees work on shift durations of 8 to 12 hours each day in a week and change over to night shift of similar duration and vice versa. Studies have been done such as those of Feri P, et al (2016) on effects of management strategies on working night shift by nurses in Nigeria which inferred that shift work pattern that considers respectfully workers health and well-being, potentially lays foundation for good quality of life. Ibrahim (2015) also conducted study on the relationship of night shift management strategies and performance of employees in hotels in Bauchi Metropolis, Nigeria.

Amsha (2014) conducted a study on shift duty paradigm on performance of nurses in Palestinian health sector; the findings found that shift duty affected the nurse's performance.

Kamau (2016) in his study on impact of shift duties towards production in textile industries Kenya revealed that shift duty impacted positively on production but negatively on individual employee production targets. Musyoka (2015) in his study on wellbeing of employees in cement manufacturing firms found that, 21% workers in cement firms in Kenya have psychological problems, while 23% live stressed, detached families, abuse alcohol and have a sense of confusion. However, these studies have been done in hospital and hotel industry which are different to cement manufacturing setting. While shift duty is widespread in the cement manufacturing sector in Kenya, the effect of shift duty management on performance on employees is not well understood since there is scanty literature on the subject. This raises the question "Does shift duty structures effect on employees' performance? Therefore, this study was designed to carry out a survey on the effects of shift duty structures on employee performance in cement manufacturing firms in Kenya.

### **1.3 Objectives of the Study**

The main objective was to assess the effect of shift duty plans management on employee performance for cement manufacturing firms in Kenya.

The specific objectives of the study were;

- i. To establish shift duty plan management in the cement manufacturing firms in Kenya.
- ii. To establish the effect of the shift duty plan management on employee performance at the cement manufacturing firms in Kenya.

#### **1.4 Hypothesis**

**H<sub>0</sub>:** There is no relationship between Shift duty and employee performance.

**H<sub>a</sub>:** There is a relationship between Shift duty and employee performance.

#### **1.5 Value of the Study**

Cement manufacturing firms may benefit from the findings of the study in identifying shift duty structures that are effective or detrimental in achieving institutional goals. Additionally, the study will also help cement manufacturers understand the effectiveness of the shift duty management hence identify solutions to problems faced by shift worker and instigate measures of performance improvement.

Shift Managers and policy makers in other industries may benefit from the findings of this study in decision making about shift duty structures, plans and their management principles. This study will also be helpful in identifying problems associated with shift duty, providing managers with insights on how to mitigate employee shift related risks exposures in the industry.

This study may form a basis for further studies in determining factors that influence effectiveness of shift duty structures management. Similarly, this study may be a valuable tool in addition to knowledge in shift duty structures management and in facilitating learning.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

The chapter presents the operational definitions, theoretical literature review, empirical literature review, research gap and conceptual framework.

#### **2.1 Theoretical Framework**

The study was based on; the system theory, the team building theory and the chaos theory.

##### **2.1.1 The System Theory**

System theory tends to explain interdisciplinary dependencies, relationships and their existence in organizations. The system theory model is anchored on elementariness of environment, input, transformation, output and feedback. According to Muhlrud et.al. (2005) systems are based on adjustments and maladjustments of man to environment. The components of the theory are the environment and the response behavior of individual (Krug *et.al.*2000). In addition, the assumption of this theory is that entities are capable of processing information specifically in their own environment in order to adapt skills that are influential to their existence. This theory views a firm or an organization as a learning system with wealth of skills and competences which are enablers of generating its own knowledge (Nonaka and Tacheucki, 1995). The firm, therefore, adopts cognitive systems to establish its own sustainable existence, through activation of skills and creation of knowledge for continuous leaning.

Managers need to adjust and plan structurally to ensure that organizations survive by constantly formulating new ways of doing business and overcoming challenges, to find adequate positioning, constantly implementing, adjusting, transforming and redefining the organizational wellbeing. This adaptive and proactive approach itself being based upon systems theory conceptual pillars in order to promote organizational sustainable and long-lasting performance.

Therefore, the Systems theory helped in the study to gauge the responses and adjustment of employees in shift structures environment and how this affect their performing in shift duties in cement manufacturing firms in Kenya.

### **2.1.2 Team Building Theory**

Cohen et al. (1997) postulate teamwork as organization of groups sharing values and objectives, working cohesively to maintain and achieve them. Salas et al. (2004) describes team work as grouping of into distinguish-able sets of two or more people who work towards accomplishing a common mission. This theory hinges successful organizations into dependency on dynamic teams that interact interdependently. Moreover, this theory emphasizes on removing hierarchical barriers brought about by management and chains of command. Similarly, the theory tends to agree out that it is all about teams accepting to involve more participation in decision making at all levels.

Team's effectiveness at times are greatly influenced by internal factors, within the organization and external factors, beyond the organization. Hence, team theory models offer insights on various way to view how teams develop in relation to their environment. Leadership models can as well focus on leadership needs in the team and leader's role to the team work.

Voluntariness in joining and forming groups is another key facet in team work. Voluntarily formed work teams pose higher levels of motivation and performance. Members in such groups often spontaneously find within themselves the will to gather together at work over tea breaks, lunch time or leisure time. Members participate in shared responsibilities, with aim of raising productivity through concerned efforts. Team members also do demonstrate warm friendship

atmosphere, constantly complementing each other through comfortable discussions, bringing in motivation in competences and self-determination. Consequently, atmosphere for innovations occur through such team work activities.

Therefore, this theory was helpful to the study in looking at how all stakeholders are consulted in designing the shift duty structure and how their involvement might reduce the effect shift duty on employee performance in cement manufacturing firms in Kenya.

### **2.1.3 Chaos Theory**

The Chaos Theory by Peters (1942), portrays everything to exist in a constant random disorderliness. Chaos theorists explain that naturally all systems go from simple to get more complicated sometimes becoming more volatile, demanding complex inputs in terms of energy to maintain them. This heightened energy demand dictates for more complex structures to maintain their stability. As such this trend continues consuming heightened levels of energy until the system integrate with other complex system or entirely disintegrates.

Managers are expected to familiarize themselves with organizations uncertainties that may arise from their immediate environment such as competition, change in global economic trends etc. Responsiveness customer demand dynamics, innovation and techno-advancements, investment portfolios, employee turnovers are some of the challenges that may require management quick decisions. Thus, firms need to learn on how to manage the constantly evolving environment.

This theory was used in the study to establish the complexity of shift duty plan management on how shift plans can be controlled to minimize effect on employee performance.

## **2.2 Shift Duty**

Shift work can be defined as working plan where working hours are divided into groups that cover the time required to execute a desired output or performance. Shift workers are those



employees schedule to work on hours between 6pm and 7am usually in a seamless handover and rotation within working hours (Kazemi, 2016). Typically, shift puts in place outlays that groups available working hours or a day into groups where workers in the dedicated time plans execute their duties (Chiduo 2012).

The shift duties are managed through different shift plans which are adopted by managements based on their suitability and adaptability to organizations strategies. Generally, in cement manufacturing firms in Kenya, three forms of shift plans are commonly used and are implemented through shift schedules or shift Rota. 8 hours rotating shift, 12 hours rotating shift and 12 hours fixed shift are mostly favored by managements in the cement manufacturing firms in Kenya.

### **2.2.2 Performance**

Performance in manufacturing firms is defined as the expectations of employer to employee on set of activities desired to be accomplished and the quality of accomplishment (Veasey, 2002). In the manufacturing industries performance is determined by set standards. Performance standards and expectations are agreed upfront by employee and supervisor. The performance is reviewed against target through performance agreement and consequently measured through performance appraisals (Hezekia, 2012). In developed countries and emerging African economies these performance agreements are referred to as performance contracts.

Performance systems in organizations are used to draw various decisions by human resource managers and give feedback to employees and supervisors (Cleveland, Murphy & Williams, 1989). Appraisals based on performance are often used to establish rewards, platforms for

reviewing effort of leadership, management and workers towards achievement of organizational goals (Cleveland, Murphy, & William, 1989).

Periodical surveys in any organization are important components of management performance measurement. The data gathering, and performance appraisal are basis for developing management systems that may motivate or retain the right resources through adequate performance rewarding (Lillian, 2011). In managing performance, systems endeavor to direct and guide resources towards achievement of high-end performances (Martin, 1998). Williams, (2002) explain that best performance practices entail determination of the strategic objectives, goals, plans, appraisal system, identification development needs and reward assignment methods.

The different techniques used to determine performance are grouped in basic and modern method. The traditional or basic method used in determination of performance is concerned with describing performance by the employee's immediate supervisor. (IJBMR, 2012). In the recent past non-traditional form of performance determination has been commonly practiced (Coens and Jenkins, 2000).

Some of the methods used to determine performance by management teams include; Management by objectives (MBO), developing an assessment center in the organization, behaviorally anchored rating scales (BARS) and 360 Degree Performance review. Here, tests, assignment and formal evaluations are given to the group of employees to determine competencies among themselves (Ijbm, 2012). BARS methods are recent in usage in that they are set to predetermine critical areas of performance.

In 360 degree include Self-appraisal, appraisal method are carried out by supervisor, managers and peer since they basically not so well structured as the traditional appraisal. They are usually less focusing on the merit and they are interested more on convening teams for employee and their supervisors (Sharma, 2012).

### **2.3 Empirical Literature Review**

Lockley et al. (2011) established that longer shifts compared to shorter shifts especially overnight lowered employees' performance. This was visible in the outcome of survey done on the same showing that every 13 out of 20 workers to experience lower performance during overnight work (between 11 pm and 7 am). Moreover, Arnedt et al. (2005) on tests carried on driving simulator, they established that there was drastically reduced attention, reduced performance and alertness on candidates subjected to heavy rotation and compared to light rotation in manufacturing industries. These studies are different from the current study because all were done in hospital setting not a cement manufacturing setting.

Maseko and Manyani (2011) did a study on the effect of long working hours on employee wellbeing in Zimbabwe. The study used survey as a research design. The target population was 100 workers from health sector. The study revealed that most of the workers who worked for long hours developed health problems such as back ache, lack and lack of sleep. This study is different as it was done in Zimbabwe and not in Kenya. Also, did not focus on the cement manufacturing firms.

Olajunji (2013) conducted a study on effects of night shift on nurses working in Nigeria. This study was carried out through a survey aided by questionnaires and analysis done using

ANOVA. The results from this study showed that night shift affected the performance of the nurses by 11%. But the working environment of nurses is different to those in cement manufacturing firms and thus, so the results cannot be replicated to Kenya cement industry.

Ibrahim (2015) studied the relationship of night shift and Performance of employees in hotels In Bauchi Metropolis, Nigeria. The study used a survey method of data collection. It was established that most of the employees had reduced performances during the night as compared to day shifts. The current study will assess the effects of shift duty in cement manufacturing firms and not in the hotel industry.

Uddin et al (2017) study on the effect of shift duty structure in Bangladesh, India, used empirical studies. The findings of the study reveal that only 20% of the employee performed well regularly during their shifts. Thus, the study concluded that shift duty has effects to employees such as social problems, and tiredness. However, the study was done in a foreign country and used empirical studies unlike this current study which will used descriptive design with both qualitative and quantitative approach.

#### **2.4 Summary of Literature review**

A summary of empirical literature review is contained in Table 2.1 below. The table contains authors, the area of study, research findings and research gaps.

**Table 2.1 Summary of empirical literature Review**

<b>Author (s)</b>	<b>Maseko and Manyani (2011)</b>	<b>Uddin et al (2017)</b>	<b>Olajunji (2013)</b>	<b>Ibrahim (2015)</b>
<b>The study</b>	Effects of long working hours on employee wellbeing in Zimbabwe	Effects of shift duty structure in Bangladesh	Effects of working night shift by nurses in Nigeria.	Relationship of night shift and Performance of employees in hotels In Bauchi Metropolis, Nigeria
<b>Research finding (s)</b>	Majority of workers who worked for long hours developed health problems such as back ache, lack and lack of sleep	Reveal that only 20% of the employee performed well regularly during their shifts	Night shift affected the performance of the nurses by 11%.	Most of the employees had reduced performances during the night as compared to day shifts.
<b>Research gap (s)</b>	Study was done in Zimbabwe and did not focus on cement industry.	The study used empirical studies, but this current study will use descriptive design with both qualitative and quantitative approach.	Done in hospital setting, the current study to be done in cement manufacturing firms	Done in Nigeria in a hotel setting current study to be done in cement manufacturing firms

Source: Researcher, 2018

## 2.5 Conceptual Framework

In this study independent variables were 8 hours fixed shift plan, rotating 8 hours shift plan and rotating 12 hours shift plan while independent variables was employee work targets, reworks on jobs, quality of work done, unsafe working, frequency of accidents and near misses as shown in Figure 2.1. Independent variables in this study was rotating 8-hours shift structure, rotating 12-hour shift structure and fixed 12-hours shift structure. These shift structures are elaborated below in Table 2.2

**Table 2.2 Shift structures**

<b>Shift schedule</b>	<b>How it operates</b>
<b>Rotating 8-hours shift</b>	This schedule is formed by a rotating shift pattern with 4 teams each rotating through day and night over 6 or 7 days. 3 teams are always active at any given day working for 8 hours each covering 24hrs, with one team on rest. In a 7 days sequence, it follows 2 <b>Nights</b> , 2 <b>Afternoons</b> , 3 <b>Mornings</b> , 2 <b>Rest</b> . In a sequence of 6 days it follows 2 <b>Nights</b> , 2 <b>Afternoons</b> , 2 <b>Mornings</b> , 2 <b>Rests</b> . (Night- 2300-0700hrs, Afternoon- 1500 – 2300hrs, Morning- 0700 – 1500hrs) Typically abbreviated as <b>NNAAMMMRR</b> . Commonly referred to as Continental shift.
<b>Rotating 12-hours shift</b>	This plan follows a sequence that utilizes 3 teams working in a 12hrs shift. It rotates in a 6-day cycle following a sequence of 2 <b>Day</b> , 2 <b>Nights</b> and 2 <b>Rest</b> ( <b>Day</b> -0700 -1900hours, <b>Night</b> -1900 – 0700 hours) Abbreviated as <b>DDNRRR</b> . Various shift schedule patterns are practiced in rotating 12hrs shift. Examples: Dupont shift schedule, Panama shift schedule, Pitman shift schedule among others.
<b>Fixed 12-hours shift</b>	This shifts schedule is commonly referred to as 2 team 12hours fixed schedule. The two-team work for 12hours in a fixed pattern with one team working on day and the other working on nights only. They normally work for straight 7 days with a provision for 1or2 days’ rest. Rest days are usually covered by staff referred to as shift relievers. Alternatively rest days are tailored to coincide with non-production days such as Sundays or routine maintenance days.

Source: Researcher (2018)

Independent variables were work targets, reworks, quality of work done, working unsafe, accidents and near misses. This is diagrammatically represented below in figure 2.1

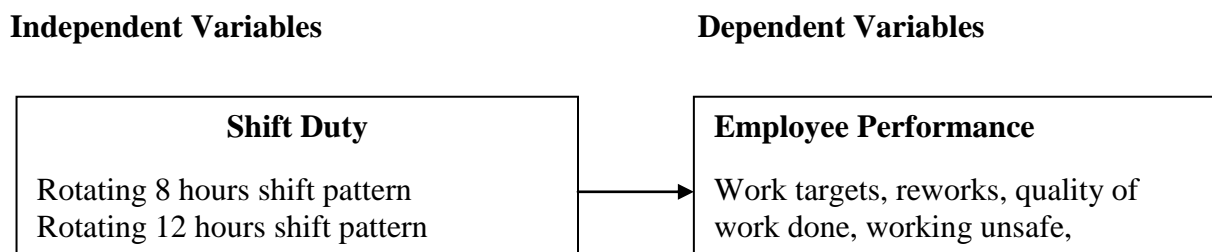


Figure 2.1: Conceptual Framework

Source: Researcher, (2018)

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 Introduction**

This chapter describes research design, population and sample size, how the variables are measured, method of data collection, reliability and validity of the research instruments as well as methods of analyzing the data collected.

#### **3.2 Research Philosophy**

Research philosophy basically by definition can fit a description of research development, research background study and knowledge of research nature (Saunders and Thornhill, 2007). Similarly, research philosophy may as well be described as research paradigm. In the words of Cohen, Manion and Morrison, (2000) research paradigm is the broad framework of understanding of theories, beliefs and basic practices that are used in carrying out research. It can also be viewed as the meticulous procedure, through which definitive processes and steps are followed by a researcher to link the research objectives with the research questions. In this study Pragmatism philosophy and Positivism philosophy are used as the basic approaches to derive the objectives, whereas qualitative and quantitative methods were also used in the capturing and analyses of the responses to achieve the study objectives

#### **3.2 Research Design**

This study adopted a descriptive research design. The research design was used mainly because it examines what, where, and when of a phenomenon. It gives description of the reality as it exists with results in the formulation of important principles of knowledge and solutions to the problem investigated (Kombo and Tromp 2011). Moreover, this design involved both qualitative

and quantitative research approach. Qualitative approach was used because of its suitability in collecting feelings of people and in this study, it will be important as the study was also interested on getting the feeling of employees towards shift duty. Quantitative methods were used to get percentages of variables, amount and relationship of the independent and dependent variables as advocated by (Kombo and Tromp 2011).

### 3.3 Population

The population of this study was all employees working in in the cement manufacturing firms in Kenya. There are eight cement manufacturing firms in Kenya as shown in Appendix I.

### 3.4 Sample Design

Simple Multi stage (two stages) sample design was used. The 1<sup>st</sup> stage took random sample of all cement factories to select four cement factories. In the 2<sup>nd</sup> stage, a random sample of 291 employees was selected. The sample of was arrived as follows;

$$n = \frac{N}{1 + N(e)^2}$$

Where;

n = Sample Size

N = Population

e = Level of Significance which is either 0.05 or 5%

With a population of 1065 employees working on, the sample was calculate as shown;

$$n = \frac{N}{1 + N(e)^2}$$

$$n = 291$$

Where: **N** was the Population; **n** was the sample size; **e** was the level of significance or error term at 0.05. Therefore, the sample size was 291 employees.



Ngechu (2004) explains the importance a sampling frame in selecting a representative sample. From the sampling frame, the representation of the required subjects was selected to form a sample. Stratified proportionate from each factory represented a stratum

According to Wario and Khalfan, (2015), sampling techniques that adopt stratified proportionate in random samples yield to representation of all parameters in the entire population. This has a higher level of precision since it is a representative sample of a homogeneous population. Stratification control variance and consequently reduces the standard error in a study. The researcher adopted simple random sampling technique from each stratum to select the 291 respondents. Simple random sampling minimized the frequency errors in a population, according to Cooper and Schindler (2003).

### **3.5 Data Collection**

The study utilized primary data which was collected through questionnaires and interviews. Kothari (2006), questionnaires are the most common data collection tools used in many research works. Due to their cost effectiveness in a large sample, questionnaires were used as recommended by Mugenda & Mugenda (2003). The questionnaire contained both closed and open-ended questions. Interview was used to get the feeling of the respondent on the independent variables. Only 10 respondents were interviewed and were selected randomly. Additionally, documentation was used to collect published data on the dependent variables.

### **3.6 Data Analysis**

The researcher checked for completeness of returned questionnaires to analyze shift duty structures management in the cement manufacturing firms in Kenya. Data collected was analyzed quantitatively using Statistical Package for Social Sciences (SPSS). In addition, the

data was graphically represented and expressed in percentages, means, standard deviations and frequencies to establish the effect of the shift duty structures management on employee performance.

The information was displayed by use of tables, charts, graphs and in prose-form. The data was analyzed through content analysis to exhibit the relationship between shift duty structures management and employee's performance. Baulcomb, (2003) explains that content analysis is crucial while making categorizations for validity and replicability inferences from data and their context. Additionally, chi-square and correlation were used in determination of there will be a relationship between shift duty and performance of employees from the research questions and the questionnaires answers.

Further, the researcher adopted use of multivariate regression model. This was employed to establish the level of dependency between the independent variables and dependent variables. The relationship between the two was tested using the equation shown below:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where:

Y= Employee performance (Work targets, reworks, quality of work done, working unsafe, accidents and near misses)

$\beta_0$ = constant term;

$\beta_1 - \beta_3$ =Beta coefficients (intercepts for independent variables);

X1= Rotating 8 hours shift pattern

X2= Rotating 12 hours shift pattern

X3= Fixed 12 hours shift pattern

$\varepsilon$  =Error term

### **3.6.1 Coding**

For interview, data was coded to be able to tabulate the data; that is each participant was given an alphanumeric code: R1, R2, R3...R10, representing research participant to ensure privacy and confidentiality (Wario and Khalfan, 2015).

### **3.6.2 Tabulation**

Tabulation was done where data was classified and arranged in tabular form in symmetric arrangement of statistical data in rows and columns. Tabulation, depending on the type of classification, may be simple or complex. (Wario and Khalfan, 2015). However, the study used only Simple tabulation which is commonly known as one-way tabulation.

### **3.6.3 Memoing**

Memoing was done to capture the emerging issues from the interviews. Wario and Khalfan (2015) describe memoing is procedural and analytical method used in research that is effectively used by new and seasoned researchers. The researcher used memoing which assisted in making conceptual link between raw data and abstractions that formed the research phenomena in the contextual frame work. Memoing was done such that the researcher could be able to arrive at the themes from the interviews (Wario and Khalfan, 2015)

### **3.6.4 Transcribing**

Data Transcription involves translating the analyzed data to give it a meaning in terms of the subject being investigated (Kothari, 2004). This was done to enable the researcher to fully identify the results.

#### **3.6.4.1 Content Analysis.**

Notes were made in the margin when interesting or relevant information was found from collected data. Types of information arising was recorded and presented in categories that gave a description of the nature of the sample data (Wario and Khalfan, 2015). Identification was done to find out if the categories were in associations or had linkage which could enable categorization of major themes and / or minor themes. The themes arising were compared. The categories or themes were examined in detail. Data was transcribed to give answers to the research questions.

#### **3.6.4.2 Logic Analysis**

Logic analysis is a system that assists researchers to demonstrate arguments and prove a case (Wario and Khalfan, 2015). It works to prove accuracy of propositions by testing them against one another. In this case, logic is found to be more paramount against emotions or common sense. Thus, data is collected and tested in a more logical sequence to achieve the desired prepositions.

#### **3.6.4.3 Thematic Analysis**

Thematic analysis is a form of data analysis for qualitative research. Thematic analysis is usually focused on pointing out the patterns within data (Wario and Khalfan, 2015). Themes are categorical in the description of a phenomenon and are closely linked with specific research question, hence thematic analysis categorization. In this study, analysis of the themes was done through coding and established in patterns.

## CHAPTER FOUR

### DATA ANALYSIS, RESULTS AND DISCUSSIONS

#### 4.0 Introduction

This study assessed the effect of shift duty plans management on employee performance for cement manufacturing firms in Kenya. Eight cement firms surveyed with aid of questionnaires and interviews as the vehicles for data collection. The data collected was grouped by the researcher according to the research objectives.

#### 4.1 Response Rate

The study targeted 291 respondents based on the derived sample from the total population 1065 employees on shift in the cement firms. However, of the distributed questionnaires to the 291 respondents, 280 questionnaires were correctly and completely filled, thus meeting the threshold put by the researcher. Mugenda and Mugenda (2003) observes that a response rate greater than 30% of the target sample representative to be the bare minimum. In this study 280 translated to 96.2% which surpasses the minimum set by Mugenda and Mugenda (2003).

**Table 4.1 Response Rate**

<b>Questionnaire</b>	<b>Frequency</b>	<b>Percentage</b>
Completely filled	280	96.2
Not Completely filled	11	3.8
Total	291	100

Source: Research data

#### 4.2 Profile of respondents

This section aimed at discussing the questionnaires collected from the respondents to enable the study to establish a good judgement in the study area. Among the researched respondents' characteristic include sex, age, highest level of education current position, and cement factory of

work. Perry (2000) contends that, personal attributes like sex, education, and age had significant effect on understanding of situations.

#### 4.2.1 Sex

Sex was analyzed to make sure there was no bias in gender and that to ascertain if the problem of academic staff turnover was known to both sexes. Table 4.2 shows the summary of results.

**Table 4.2 Sex of Respondents**

<b>Sex</b>	<b>Frequency</b>	<b>Percentage</b>
Male	200	71.4
Female	80	28.6
Total	280	100.0

Source: Research data

Table 4.2 shows that, both male and female respondents were participated in this study. 71.4% forming the majority represented male respondents while 28.6% formed the minority representing the female respondents. The importance of this data was to establish that data was collected with bias from both genders. Mugenda and Mugenda (2003) points out that while dealing with satisfaction of people, then the results should ensure gender parity avoid bias. However, the percentage of female portrayed a low percentage signified by the fact that much of the shift duty jobs in cement firms are technically oriented, physical and back breaking hence females tend to look down on them.

#### 4.2.2 Age

Respondents' age was also noted as key to the study since various t age groups have varying opinion as Wario and Wako (2015) observes, the study of the opines that all ages should be represented. Table 4.3 shows the summary of results.

**Table 4.3 Age of respondents**

<b>Age (years)</b>	<b>Frequency</b>	<b>Percentage</b>
20- 35	12	9.2
36-45	48	50.0
46-55	52	27.0
55 and above	18	13.8
<b>Total</b>	<b>280</b>	<b>100.0</b>

Source: Research data

From the Table 4.3, the respondents aged 36 –45 form 50% of the respondents. The indication of this was that majority of the employees in cement firms in Kenya working on shift are in their middle life, implying that they have settled or are settling in family life and in careers. Minority are in the age brackets of 20-35 years, 9.2% signifying fresh from college and setting foundation in careers. All ages were catered for in the study, as O’Brien (2002) argues, that it is meaningful to include all ages in a study because different ages may give varying opinions.

#### **4.2.3 Marital Status**

The study also investigated marital status of respondents. Table 4.4 give the summary of results.

**Table 4.4 Marital status**

<b>Marital status</b>	<b>Frequency</b>	<b>Percentage</b>
Single	50	17.9
Married	220	78.6
Divorced	5	1.7
Widowed	10	3.6
<b>Total</b>	<b>280</b>	<b>100.0</b>

Source: Research data

In investigating the marital status of the respondents, the Table 4.4 shows that, 220 staff which equal to 78.6% were married. This signifies that majority of the employees in shift work in cement firms in Kenya are settled in life and they have marital obligations. 17.9% of the

respondents were single, 1.7% were divorced and 3.6% were widowed, forming the minority groups which, implying lesser marital responsibilities which could be possibilities of either beginners in family life or complexities attributable to shift duty job. This data was important to the study because marital status may have some weight in areas such as paternal or maternal obligations hence, they might affect performance of employees.

#### **4.2.4 Education Level of Respondents.**

The study had an interest of establishing the level of education of respondents.

**Table 4.5 Respondents Level of education**

<b>Level of Education</b>	<b>Frequency</b>	<b>Percentage</b>
Diploma	120	42.9
Degree	110	39.3
Masters	30	10.7
Doctorate	1	0.4
Other (specify)	19	6.8
Total	280	100.0

Source: Research data

Table 4.5 shows that, 42.9% of the respondents were diploma holders while 39.3% of the respondents were degree holders. This implies that the upper quartile of employee working on shift duty have adequately educated. However, the researcher didn't probe further to establish whether the background of training was technical or non-technical. Further, the researcher established that 10.7% and 0.4% of the respondents had Masters and Doctorate degrees in their levels of education. However, a percentage of 6.8% of the responded indicated other, which the researcher found out that in grade tests technical education such as welders, fitters, plumbers, lathe machine operators, mobile plant operators and post primary school education. Education



was important to the study such that the study can gauge the understanding of the topic at hand. Grace and Khalsa (2003) opines that different levels of education may have different opinions.

#### 4.2.5 Current position of respondents

The study also investigated the position of the respondents. Table 4.6 shows the summary of results.

**Table 4.6: Position of respondents**

<b>Position</b>	<b>Frequency</b>	<b>Percentage</b>
Managers	22	7.9
Supervisors	73	26.1
Shift duty employee	185	66.0
Total	280	100.0

Source: Research data

Table 4.6 shows that, 7.9% of the respondents were managers in the capacity of shift coordinators, shift engineers, and managers on call. 26.1% of the respondents were supervisory staff in charge of shop floors and loading lines. Majority of the respondents, 66% were general staff who held neither positions of management nor supervisory in the cement firms studied. This data was important to the study in forming basis for establishment of positions of respondents in employment.

#### 4.2.6 Respondents Cement Factory

The study also analyzed the cement factory firm from which the respondents were drawn from. This was important to see the distribution of the respondents in the four cement manufacturing firms.

**Table 4.7 Respondents work factory**

<b>Cement Factory</b>	<b>Frequency</b>	<b>Percentage</b>
Bamburi Cement Ltd	61	31.7
National Cement Ltd.	77	27.5
Mombasa Cement Ltd.	74	26.4
Savannah Cement Ltd.	68	24.3
Total	280	100.0

Source: Research data

The distribution of the respondents was as shown in Table 4.7 indicated that 31.7% of the respondents were drawn from Bamburi Cement Ltd, 27.5% from National cement Ltd, 26.4% and 24.3% of the respondents drawn from Mombasa cement Ltd and Savannah cement Ltd respectively. This data from the Table 4.7 shows that all the four cement manufacturing firms randomly sampled from the two-stage sampling participated in the study and had substantial number of respondents. This is in line with wario and Khalfan (2015) that fair distribution of the respondents is needed for generalization of the results.

In the previous chapter three methodologies the study was obliged to use both qualitative and quantitative. The analysis therefore will be two pronged; qualitative and quantitative;

### **4.3 Qualitative data Analysis (Interviews)**

Memoing was done on the interview transcripts and the emerging themes were analyzed.

#### **4.3.1 Emerging Themes**

The cluster analysis method was used to analyze the emerging themes from qualitative data.

The related themes were grouped together and set for further analysis. According to Wario and Khalfan (2015). The researcher used this method of analysis for both quantitative and qualitative data emanating from open ended questions in the questionnaire. Four themes relevant to specific objectives of the study emerged from the qualitative data: (a) type of shift duty, (b) Description of the current shift structure, (c) Target achievements during shift duties, (d) Influence of shift duty plan management on performance of employees, and (e) Areas need addressed

#### **4.3.1.1 Emerging Theme (a): Type of shift duty in cement manufacturing firms**

This question sought to establish what type of shift duty management plan is practiced in their cement manufacturing firm. During the interview transcript analysis four types of shift duty plans emerged, rotating 8 hours shift plan, Rotating 12 hours shift plan Fixed 12 hours shift plan and Combination of rotating 8hour shift plan and rotating 12hour shift plan. This data is shown in table 4.1 below.

**Table 4.1 Type of shift duty plan**

<b>Shift duty plan</b>	<b>Frequency</b>	<b>Percentage</b>
Rotating 8hour shift plan	57	20.4
Rotating 12hour shift plan	137	48.9
Fixed 12hour shift plan	57	20.4
Combination of rotating 8-hour ad rotating 12hour shift plan	29	10.4
<b>Total</b>	<b>280</b>	<b>100.0</b>

Source: Research data

Based on the interview transcripts, majority of the respondents mentioned that, rotating 12 hours shift plan Fixed is commonly used in their cement manufacturing firm. For instance, respondent RP3 said;

“Unless there is a breakdown in the factory always, we have the

Rotating 12 hours shift plan Fixed in our factory”

Also, during the interview respondent RP2, RP3, RP5, RP7, RP9 said;

*“In our cement manufacturing factory, we use 12-hour shift plan”*

This data is like results of Maseko and Manyani (2011) on their study on effects of long working hours on employee wellbeing in Zimbabwe where they found the Rotating 12 hours shift plan was common. This confirmation from the interviewees shows clearly that rotating 12 hours shift plan is common in cement manufacturing firms in Kenya.

#### **4.3.1.2 Emerging Theme (b): Description of the current shift structure**

Respondents were further probed to describe the current shift structure in their organization and whether it was stable or unstable in its operation in cement firm. This was to establish if it exhibited steadiness. In addition, this was probed in effort to capture a clear impression that the employee indeed really served continuously in the identified shift duty regime in theme (a) above. The findings are described by figure 4.2 below.

<b>Description of shift structure</b>	<b>Frequency</b>	<b>Percentage</b>
Stable	196	70.0
Moderately changing	56	20.0
Unstable and unpredictable	28	10.0
Total	280	100.0

Figure 4.2 Description of shift structure.

Source: Research data.

From the interview transcripts 70% of the respondents observed that their shift duty plan was stable, 20% percent of the respondents observed moderately changing stability of shift duty plan management. While only 10% of the respondents observed unstable and unpredictable shift duty

plan. This data implies that in most of the cement firms in Kenya the shift plan duty management are stable.

#### **4.3.1.3 Emerging Theme (c): Target achievements during shift duties**

The respondents were further asked to describe the rate of the target achievement during a shift duty. This was to capture if really target are met during shift duties.

**Table 4.3 Targets achievement by employees**

<b>Targets achievement</b>	<b>Frequency</b>	<b>Percentage</b>
Fully achieved	56	20.0
Somehow achieved	56	20.0
Moderately achieved	140	50.0
Not sure	28	10.0
Total	252	100.0

Source: Research data.

The transcripts indicated that 50% of the interviewees observed moderately achieved, 20% of the respondent observed fully achieved while also 20% of the respondents also observed somehow achieved. This data implies that during shift duties employees do not fully achieve their targets. The results are supported by the results of Anis (2010) who in his study on “Extended Work Duration and the Risk of Self-Reported Percutaneous Injuries in Interns” found that most of the injuries were reported during shift duty.

#### **4.3.1.4 Emerging Theme (d): Influence of shift duty plan management on performance of employees**

The researcher wanted to find out from the interviewees their opinion on the influence of shift duty plan management on performance of employee.

**Table 4.4 Influence of shift duty on employee performance**

<b>Influence of shift duty on employee performance</b>	<b>Frequency</b>	<b>Percentage</b>
Very high	28	10.0
High	168	60.0
Low	56	20.0
Very low	28	10.0
Total	280	100.0

Source: Research data

The interview data shows that, 60% of the respondents observed high effects of shift duty on employee performance, 20% of respondent observed moderately influence, 10% of the respondents observed very high and low effect was also observed by 10% of the respondents. The data implies that shift duty plan management has high influence on performance of employees. This result concurs with the results of Chiduo (2012). In his study on “The Effect of Shift Structure on Performance in the USA companies” found that performance of employees reduced during shift duty.

#### **4.3.1.5 Critical areas needed to be addressed in developing structures in shift duty planning**

The respondents were also asked to give areas which needed to be addressed in shift duty planning. The interviews transcripts show the respondents mentioned break intervals, salary

scale due to extra hours during shifts and work pressure to attain targets. There after their responses were analyzed below to show weighting of the needs.

**Table 4. Areas which need to be addressed**

<b>Variable</b>	<b>Frequency</b>	<b>Percentage</b>
Break Interval	114	40.8
Salary scale	80	28.6
Work pressure	86	30.8

Source: Research data

Table 4.10 shows that, break interval was the leading area where there was need to be addressed, with 40.8% of the respondents, followed by work pressure with 30.8% of the respondents and lastly salary scale which had 28.57 of the respondents. These results compare with those of Amsha (2014) where he found that break interval was a concern in effects of shift duty among nurses in Palestinian public health sector.

#### **4.3.1.6 Critical areas needed to be addressed in developing structures in shift duty planning**

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**Table 4 Areas which need to be addressed**

<b>Variable</b>	<b>Frequency</b>	<b>Percentage</b>
Break Interval	114	40.8
Salary scale	80	28.6
Work pressure	86	30.8

Source: Research data.

Table 4.10 shows that, break interval was the leading area where the respondent felt needed to be addressed, with 40.8% of the respondents, work pressure with 30.8% of the respondents and lastly salary scale and benefits which had 28.57 of the respondents. These results compare with

those of Amsha (2014) where he found that break interval was a concern in effects of shift duty among nurses in Palestinian public health sector.

#### 4.4 Quantitative Data Analysis (Questionnaires)

##### 4.4.1 Shift duty plan management in the cement manufacturing firms in Kenya

This was the first objective of the study and sought to establish the shift duty plan management in the cement manufacturing firms.

##### 4.4.1.1 Shift plan adopted cement firms

The shift plan adopted by cement manufacturing firms was important to the study. The Table 4.8 shows the summary of the results.

**Table 4.7 shift plan adopted by cement firms**

<b>Shift plan</b>	<b>Frequency</b>	<b>Percentage</b>
Rotating 8 hours shift plan	20	7.1
Rotating 12 hours shift plan	120	42.9
Fixed 12 hours shift plan	120	42.9
Combination of rotating 8hour shift plan and rotating 12hour shift plan	20	7.1
<b>Total</b>	<b>280</b>	<b>100</b>

Source: Research data

Table 4.7 shows that, most cement manufacturing firms had chosen rotating 12 hour shift plan and fixed 12 hours shift plan which had been each observed by 42.9% of the respondents. Combination of rotating 8hour shift plan and rotating 12hour shift plan was mentioned by 7.1% percent of the respondents. Also, Rotating 8 hours shift plan was observed by 7.1 % of the respondents. Thus, these findings imply that, 12 hour shift plan and fixed 12 hours shift plan are most favored shift plan by Kenya cement manufacturers.



#### 4.4.1.2 Shift structure plan management and stability of production in Cement factories

Stability of production and the shift structure plan was a concern to study. Table 4.9 shows the summary of results.

**Table 4.8 stability of shift structure plan management**

<b>Variable</b>	<b>Frequency</b>	<b>Percentage</b>
Stable	209	74.6
Moderately Changing stability	70	25.0
Unstable and unpredictable	1	0.4
Total	280	100.0

Source: Research data

Table 4.8 shows that, 209 respondents equal to 74.6% observed stable shift structure plan management, 70 respondents equal to 25% said moderately changing stability and 1 respondent equal to 0.4% observed instable and unpredictable. This data implies that, in cement manufacturing firms the shift structures plans were stable. These results are similar to those of Maseko and Manyani (2011) who in his study of effects of long working hours on employee welfare in Zimbabwe found that shift structures were stable even though the workers worked for long hours.

#### 4.4.1.3 Chi-square test on shift structure plan and stability of production

**Table 4.9: Chi-Square Tests**

	<b>Value</b>	<b>Degree of Freedom</b>	<b>Sig. (2-sided)</b>
Pearson Chi-Square	14.761	3	0.002

Source: Research data

From table 4.10 reveals that there statistically significance an association between shift structure plan management and stability of production. Since, the significance value (p-value) was 0.002 which is less than 0.05 level of significance; p-value is less than significance level.

This part discussed the first objective; to establish shift duty plan management in the cement manufacturing firms in Kenya. The effect of shift duty plans on employees' performance as an issue has received more concerns from interested organization such as regulatory bodies in industrial setups. Most cement manufacturing firms had chosen rotating 12 hour shift plan and fixed 12 hours shift plan. Unlike according Olagunji (2013) in the developed world such as USA, UK and Germany they prefer the 8hour shift. The leading shift plan objective was "To maximize organizations productivity" and shift duty structures were observed in Kenyan cement manufacturing firms to be stable in their shift structure plan.

#### **4.4.2 Effect of shift duty plan management on employee performance at the cement manufacturing firms**

##### **4.4.2.1 Shift duty management and employee performance**

Statements were given to the employee concerning shift duty management. In a Likert scale as shown in Table

Key: Ranks ( 4 = Very Likely, 3 = Likely, 2 = Unlikely, 1 = Very unlikely)

**Table 4.11 Rating scale**

<b>Mean Range</b>	<b>Response Mode</b>	<b>Interpretation</b>
1.00 - 1.75	Very unlikely	Very low
1.76 - 2.50	Unlikely	Low
2.51 - 3.25	Likely	Moderate
3.26 - 4.00	Very Likely	High

Source: Research data

**Table 4.12 Shift duty plan management and employee performance**

<b>Statement</b>	<b>N</b>	<b>Mean</b>	<b>Std.Deviation</b>
Accidents and near misses at work	280	1.58	0.727
Unsafe working	280	2.81	0.961

Tasks executed incompletely, requiring reworks.	280	1.89	0.584
Targets are achieved	280	3.91	0.712
Targets achievements are within the desired quality	280	2.93	1.233
Demonstration of creativity and innovativeness	280	1.02	0.635
Outperformance to non-shift employees	280	3.13	1.089
Driving implementation of firms KPI	280	1.48	0.772

Source: Research data

Table 4.12 shows that shift duty plan management affects employees by making targets to be achieved. This had a mean of 3.91 which meant likely target will be achieved. However, statements such as Accidents and near misses at work, Tasks executed incompletely, requiring reworks, Demonstration of creativity and innovativeness and Driving implementation of firms KPI had low means which meant very unlikely.

#### **4.4.2.2 Rate of shift employee’s effectiveness in their assignments**

The respondents were asked to rate the shift employee effectiveness in their assignment and Table 4.13 shows the summary of results.

**Table 4.13 Rate of shift employee’s effectiveness in their assignments**

<b>Variable</b>	<b>Frequency</b>	<b>Percentage</b>
Very high	60	21.4
High	60	21.4
Moderate	130	46.4
Low	20	7.1
Very low	10	3.6
Total	280	100

Source: Research data

Table 4.13 shows that, 60 respondents equal to 21.4 said the employee effectiveness in their assignment was very high, 60 respondents equal to 21.4%, also said the employee effectiveness in their assignment was high, 130 respondents equal to 46.4% observed moderate, 20 respondents equal to 7.1% said low while 10 respondents equal to 3.6%. This data implies that shift duty employee is effective although majority (46.4%) observed it as moderate.

#### **4.4.2.2 Chi- square test on shift duty and effectiveness of employees**

**Table 4.14: Chi-Square Tests**

	<b>Value</b>	<b>Degree of Freedom</b>	<b>Sig. (2-sided)</b>
Pearson Chi-Square	11.461	3	0.002

Source: Researcher, 2018

From table 4.15 reveals that there statistically significance an association between shift duty plan management and effectiveness of employees. Since, the significance value (p-value) was 0.002 which is less than 0.05 level of significance; p-value is less than significance level.

#### **4.4.2.3 Rate of shift employee’s support toward implementation of safe work operations**

The study in this part analyzed support towards implementation of safe work operations. Table 4.16 shows the results.

**Table 4.15 Rate of employee’s support toward implementation of safe work operations**

<b>Variable</b>	<b>Frequency</b>	<b>Percentage</b>
Most supportive	2	0.7
Very Supportive	50	17.8
Supportive	120	42.9
Less supportive	70	25.0
Not supportive at all	38	13.6
Total	280	100.0

Source: Research data

Table 4.15 shows that, 120 respondents equal to 42.9% observed supportive toward implementation of safe work operations, 70 respondents equal to 25% indicated less supportive, 50 respondents equal to 17.8 observed very supportive, 2 respondents equal to 0.7 indicated the employees were most supportive. These results concur with those of Chiduo (2012) who found that shift employees were supportive toward implementation of safe work operations in public hospitals in Nigeria.

#### **4.4.2.5 Response on whether shift duty management influence performance**

This part focused on whether shift duty management can influence performance. Table 4.16 shows the summary of results.

**Table 4.16 whether shift duty management influence performance**

<b>Variable</b>	<b>Frequency</b>	<b>Percentage</b>
Agree	120	42.8
Strongly agree	70	25.0
Neutral	50	17.9
Disagree	11	3.9
Strongly disagree	29	10.4
TOTAL	280	100.0

Source: Research data

Table 4.16 shows that, majority of the respondents (42.8%) agreed in addition to those who strongly agrees (25%) that shift management has influence in employee performance. However, these results contradict results of Veasey, et al (2002) who found that shift duty management does not influence performance in the American firms.

#### 4.4.2.6 Chi- Square Test on shift duty management and performance

**Table 4.17: Chi-Square Tests**

	<b>Value</b>	<b>Degree of Freedom</b>	<b>Sig. (2-sided)</b>
Chi-Square	17.316	6	0.008

Source: Researcher, 2018

Table 4.18 proves that there is statistical significance and association between shift duty management and performance of employee, since the significance value (p-value) was 0.008 which is less than, 0.05 level of significance.

#### 4.4.2.7 Correlation Analysis

**Table 4.18 Correlation analysis for the relationship between Shift duty and employee performance**

		<b>Shift duty</b>	<b>Employee performance</b>
Shift duty	Pearson Correlation	1	.628**
	Sig. (2-tailed)		.000
	N	280	280
Employee performance	Pearson Correlation	.628**	1
	Sig. (2-tailed)	.000	
	N	280	280

**\*\*.** Correlation is significant at the 0.01 level (2-tailed).

**Source:** Research data

For testing the research hypothesis, the relationship between Shift duty plan management and employee performance, a bivariate correlation analysis was run in Table 4.7 above. The correlation considered the values collated from the different aspects of employee performance with those collated from the constructs of Shift duty. The analysis was conducted at a 95% level of significance.

The results of the Pearson correlation coefficient indicate that there a significant relationship between the shift duty plan management and employee Performance ( $r = 0.628$ ,  $P - \text{value} < 0.05$ ). That result indicates that there is a significant relationship between shift duty plan management and employee performance.

#### 4.4.2.8 Regression Analysis

Multiple regression analysis method was used in this study to test the influence of predictor variables.

In this study, SPSS was used to analyze the data from respondents and compute results

**Table 4.19: Model Summary**

<b>Model</b>	<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std error of estimate</b>
1	0.86662	0.7503	0.6902	0.7325

Source: Researcher data

R-Squared is a model used in a statistical evaluation of data. R-square is assumed as 1 when getting the ratio of variability residue. The  $R^2$  also is referred to as the coefficient of multiple determinations. It is expressed as the percent of the variance in the dependent solely or paired with the independent variables.

The derived value of 69.02% of the employee performance change could be attributed to effects of both the predictor variables.

### Summary of One-Way ANOVA results

Model	Sum of Squares	df	Mean square	f	sig
Regression	9.223	3	3.07	5.80	0.023
Residue	42.876	39	1.10		
Total	52.099	42			

Source: Research data

The probability value of 0.023 indicates that the regression relationship was highly significant in predicting how Rotating 8 hours shift pattern, rotating 12 hours shift pattern and fixed 12 hours shift pattern affected the employee performance.

### Regression coefficients of the relationship between employee performance and the three predictive variables

Model	Unstandardized Coefficient B	Std. error	Standardized Coefficient Beta	t	Sig
1 (Constant)	1.053	0.217		2.889	5.31E-03
Rotating 8 hours shift pattern	0.682	0.149	0.613	5.309	1.58 E-06
Rotating 12 hours shift pattern	0.701	0.181	0.149	3.210	2.10 E-03
fixed 12 hours shift pattern	0.599	0.196	0.234	4.255	7.9 E-05

Source: Research data



As per the SPSS generated table above, the equation ( $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \epsilon$ ) becomes.

$$Y = 1.053 + 0.682X_1 + 0.701X_2 + 0.599X_3$$

The above regression equation has demonstrated that *ceteris paribus* (Rotating 8 hours shift pattern, Rotating 12 hours shift pattern and fixed 12 hours shift pattern) employee performance was 1.053 at constant zero. The findings also presents that, taking all other independent variables at zero, every unit increase in Rotating 8 hours shift pattern would lead to a 0.682 increase in the scores of employee performance. Similarly, in very unit increase in the scores of Rotating 12 hours shift pattern would lead to a 0.701 increase in the scores of employee performance. Further into these findings, it also shows that in each unit increase in the scores of fixed 12 hours shift pattern would lead to a 0.599 increase in the scores of employee performance.

Overall, rotating 12 hours shift pattern had the greatest effect on employee performance, followed by Rotating 8 hours shift pattern while fixed 12 hours shift pattern had the least effect to employee performance. All the variables were significant ( $p < 0.05$ ). In summary of the findings; Rotating 8 hours shift pattern would affect employee performance with 68.2%, rotating 12 hours shift pattern would affect employee performance with 70.1% and fixed 12 hours shift pattern would affect employee performance with 59.9%.

Hence, the study rejected the null hypothesis;  $H_0$ : There is no relationship between Shift duty and employee performance and accepted the alternative hypothesis;  $H_a$ : There is a relationship between Shift duty and employee performance. This study, being one of the few surveys done on the shift duty plan management in cement manufacturing in Kenya, has contributed to

highlight the relationship between shift duty management and employee performance. Shift duty structures according to Kiage (2013) should be responsible of employee work environment factors that may impact on their health. Particularly sleep cycle, ergonomic satisfaction, psychological wellbeing and fatigue. The findings of this study therefore suggest that employees on shift duty are high vulnerable to variation of work schedules and frequent health checks need to be carried out regularly. Therefore due to that there is significant relationship with shift duty plan management and employee performance.

Consequently, shift duty working conditions require regular and continuous reviews to ensure that employees are not exposed to health and psychological disorders. The study further suggest that implementing the best shift duty plan is always necessary in reducing the collateral effects brought about by shift schedules that may negatively impact on firms productivity. More precisely, it can be inferred that shift patterns that are more respectful of the employee wellbeing are influential to increase in both individual employee and firms' productivity. Thus, this study, similar to most studies done before highlights significantly relationship between employee's performance and shift duty plan management.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Introduction**

This Chapter presents the research findings generated from the questionnaires and interviews, which were analyzed in the previous chapter. The research findings of the descriptive statistics address each research objective. The findings of the study are presented in prose form.

#### **5.2 Summary**

The specific objectives of the study were; to establish shift duty plan management in the cement manufacturing firms in Kenya and to establish the effect of shift duty plan management on employee performance in cement manufacturing firms in Kenya.

The study findings show that, majority of the cement manufacturing firms had adopted rotating twelve-hour shift plan and fixed twelve hours shift plan. This is based on response of majority of the respondent which formed forty five percent of the responses, whereas a combination of rotating eight-hour shift plan and rotating twelve-hour shift plan was mentioned by seven percent of the respondents. Additionally, rotating eight hours shift plan was observed by the minority seven of the respondents, contributing to seven percent.

The study findings also brings out that, majority of the respondents observed shift structure plan management was stable, a quarter of respondents observed it as moderately stable while minority of the respondent observed shift plans as unstable and unpredictable. Further, the study reveals significant relationship existed between shift structure plan management and stability of production. Similarly, the findings show that break interval was the leading area that needed to be addressed, based on the majority of the respondents. Work pressure as well according to a

median class of the respondents and minority observing salary as an area which required to be addressed in shift duty plan management.

The study found that shift duty plan management affects employees' achievement of the set targets. This was drawn from the findings that half of the respondents said the shift duty employee effectiveness in their assignment was moderate. However, twenty one percent of the respondents held to the opinion that shift duty employee's effectiveness in completion of their assignment was very high. And similar percentage held the opposite of the opinion, that the employee effectiveness in their assignment was low. Therefore, the findings draw a conclusion that statistically there is significance and an association between shift duty plan management and effectiveness of employees.

The study finding also show that, forty percent of the respondents agreed that shift duty management influence employee performance, while a quarter of the respondents strongly agreed on this, the minority of the respondents disagreed. The Pearson correlation coefficient indicates existence of a relationship between the Shift duty and employee Performance. Hence, this is indicative of conclusion that there is a significant positive relationship between Shift duty and employee Performance.

Regression test showed that rotating twelve hours shift pattern had the most major effect on employee performance, closely followed by rotating eight hours shift pattern while fixed twelve hours shift pattern had the least effect to employee performance.

### **5.3 Conclusion**

The study concluded that most cement manufacturing firms in Kenya had chosen rotating twelve hours shift plan and fixed twelve hours shift plan. This conclusion was different to that of

Olagunji who found that in the developed world such as USA, UK and Germany they prefer the 8hour shift. The study also concluded that there is effect of the shift duty plan management on employee performance at the cement manufacturing firms in Kenya. This was confirmed by Pearson correlation coefficient which indicated that there exists a relationship between the Shift duty and employee Performance. The outcome indicated that there is a significant positive relationship between Shift duty plan management and employee Performance.

#### **5.4 Implication of the Study**

This study is an eye opener to the management of cement manufacturing firms and other industries that employ shift duty. As observed by Kiage, shift duty plan management should be sound, robust and considerate to the employee's wellbeing, since it has effects to the performance of employees. Thus, this study concurs with previous studies and therefore will enable organizations to implement the best shift duty plans as it is always necessary in reducing the incidental effects brought about by shift schedules that may negatively impact on firm's productivity.

#### **5.5 Recommendation**

The study had the following recommendations:

Since most cement manufacturing firms in Kenya had chosen rotating twelve-hour shift plan and fixed twelve hours shift plan, both shift duty plan management should be analyzed well such that firms eliminate from them inconsistencies that lower employees' performance. This will enable cement manufacturing firms to maximize output of employees working in shift duty and consequently increase overall organizations performance.

Since the study finding clearly show that the shift duty plan management used has effect on employee performance in the cement manufacturing firms in Kenya, then, the government, policy makers and factory managers must come up with shift duty employees support guidelines on how best to implement strategies of management in shift duty plan within conducive working environment, individual employees welfare and regular health checkups.

### **5.6 Areas of Further Studies**

The study examined effect of shift duty in cement manufacturing firms in Kenya. However, it was also established that most cement manufacturing firms that employ the largest number of employee on shift duties are run by Asian Conglomerates and favor twelve hour shift plan.

Whereas, European and local Amalgams favor eight hour shift duty plans and employ lean shift duty employees. Other studies therefore, need to be carried out to establish the operational efficiencies derived from the twelve hours and eight hours shift plans strategies.

Similarly, other studies need to be done in other manufacturing firms such as food industries to find out if their findings have a correlation between shift duty and performances of employees.

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## APPENDIX I: QUESTIONNAIRE

### SECTION A: GENERAL INFORMATION

To be completed by Managers, Supervisors or an employee on shift duty.

Please answer the following questions.

1. What position do you hold currently in the organization?
2. Which is your current department? (Please specify)
3. Sex: Male ( ) Female ( )
4. Education: Diploma ( ) Degree ( ) Masters ( ) Doctorate ( ) Other ( )

### SECTION B: SHIFT DUTY PLAN MANAGEMENT

5. Please tick the shift plan in adopted in your firm?

- Rotating 8hour shift plan
- Rotating 12 hours shift plan
- Fixed 12 hours shift plan
- Combination of rotating 8hour shift plan and rotating 12hour shift plan

6. How would you describe the current shift structure in your organization?

- Stable [ ]
- Moderately changing [ ]
- Unstable and unpredictable [ ]

7. Which critical areas need to be addressed in developing structures in shift planning? Please specify.

### SECTION C: EFFECTS OF SHIFT DUTY ON EMPLOYEES PERFORMANCE

8. Please rate the extent to which the following factors are occasioned in the shift duty.

Ranks ( 4 = Likely, 3 = Un likely, 2 = Very likely, 1 = Very unlikely)

- |  | 5   | 4   | 3   | 2   | 1   |
|--|-----|-----|-----|-----|-----|
| <input type="checkbox"/> Accidents and near misses at work | [ ] | [ ] | [ ] | [ ] | [ ] |
| <input type="checkbox"/> Unsafe working                    | [ ] | [ ] | [ ] | [ ] | [ ] |

- Tasks executed incompletely, requiring reworks. [ ] [ ] [ ] [ ] [ ]
- Targets are achieved. [ ] [ ] [ ] [ ] [ ]
- Targets achievements are within the desired quality [ ] [ ] [ ] [ ] [ ]
- Demonstration of creativity and innovativeness [ ] [ ] [ ] [ ] [ ]
- Outperformance to non shift employees [ ] [ ] [ ] [ ] [ ]
- Driving implementation of firms KPI [ ] [ ] [ ] [ ] [ ]

9. How do you rate shift employee's effectiveness in their assignments?

- Very high [ ]
- High [ ]
- Moderate [ ]
- Low [ ]
- Very low [ ]

10. How do you rate shift employees support toward implementation of safe work operations?

- Most supportive [ ]
- Very Supportive [ ]
- Supportive [ ]
- Less supportive [ ]
- Not supportive at all [ ]

11. Proper shift duty management can greatly influence increased performance, productivity and reliability on employees on shift duty.

- a) Agree [ ]
- b) Strongly agree [ ]
- c) Neutral [ ]
- d) Disagree [ ]
- e) Strongly disagree [ ]

Thank you for your participation and genuine contribution.

Date of data collection \_\_\_\_\_

## APPENDIX II: INTERVIEW GUIDE

1 What type of shift does your firm practice?

- 2 In your opinion does shift duty plan management influence performance of employees?
- 3 How often are accidents, incomplete job assignments occur during shift duties?
- 4 How would you describe the current shift structure in your organization towards employee's performance?
- 5 How would you rate target achievements during shift duties in your firm?

#### **APPENDIX IV: LIST OF CEMENT MANUFACTURING FIRMS**

1. Bamburi Cement Ltd.
2. East African Portland Cement Co.Ltd.
3. Savannah Cement Ltd.
4. Athiriver Mining Ltd
5. Mombasa Cement Ltd.
6. National Cement Ltd.
7. Ndovu Cement Ltd
8. Rai Cement Ltd

#### **APPENDIX VI: BUDGET**

<b>Activity</b>	<b>Units</b>	<b>Amount (KSH)</b>
Printing and Photocopying		
Binding		
Internet charges		
Travelling expenses		
meals		

**APPENDIX V: TIME SCHEDULE**

ACTIVITY	TIME TO BE TAKEN															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Topic, setting, literature reviewing	■	■														
Problem setting/ Research design			■	■	■											
Data collection						■	■	■								
Answering Research questions									■	■	■	■				
Data analysis& interpretation													■	■		
Report compilation & submission															■	■