UNIVERSITY OF NAIROBI

IMPLEMENTING OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEMS: AN ANALYSIS OF EMPLOYEE CAPACITY GAPS AT A WIND ENERGY ESTABLISHMENT IN KENYA

FACULTY OF ARTS

DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

CGP 598: PROJECT PAPER

OCHIENG CYNTHIA ACHIENG

C50/69793/2013

A project paper submitted in partial fulfilment of the requirements for the award of the Degree of Master of Arts in Environmental Planning and Management of the University of Nairobi.

DECLARATION

This project is my own original work and has not been presented for a degree in any other University.

Ochieng Cynthia Achieng Signature:_____ Date: _____

This project report has been submitted for examination with our approval as University supervisors

Dr. Martin Marani Signature:_____ Date: _____

Department of Geography and Environmental Studies,
University of Nairobi

Dr. Alice Oluoko-Odingo Signature:_____ Date: _____

Department of Geography and Environmental Studies,
University of Nairobi

DEDICATION

To Eng. Jacob Imbo, my beloved husband; Shawn, Eliana and Nelia my children.

To Mr. Joseph A. Ochieng and Mrs. Rachel N. Ochieng, my late dad and mum.

ACKNOWLEDGEMENT

I thank God for the grace he bestowed on me as I prepared for this study. I thank Him for the gift of life and strength and intellectual capabilities to realize this dream.

I would also wish to acknowledge the support of my supervisors; Dr. Martin Marani and Dr. Alice Oluoko-Odingo whose guidance and insight provoked me to think of the research more critically, focusing on that which will be beneficial not only to me but to the Occupational Safety and Health implementation in different industries and the University of Nairobi Department of Geography and Environmental Studies teaching staff who have contributed to my understanding of theories and concepts applied in this research.

I appreciate the contribution of Mr. Sam Ogola and Mr. Caleb Ouma for their assistance in data collection. Bernadette Nzomo who gave me a better understanding of the cleaning and analysis of data and opened my mind to the simplicity of data analysis tools and Mr. Mbewa David who assisted in reviewing my research paper critically and objectively, which helped me in continuously improving my report.

Special thanks to my husband Jacob Imbo for his love and support and to my family at large for constantly nudging me to keep on and complete my research.

Finally I would also like to recognise and appreciate the support and assistance accorded to me by Vestas Eastern Africa Limited management and the entire team. Their support without question towards my completion of the research is highly appreciated.

DISCLAIMER

The views in this document are solely the views of the author and do not in any way reflect the views of Vestas Eastern Africa Limited or its associates at the Lake Turkana Wind Power Project.

ABSTRACT

Occupational Safety and health Management Systems are being implemented globally for the purpose of certification. Limited information however is available on their effectiveness in achieving reduction in occupational injuries and incidents. This study examines the effectiveness and the participative role of employees in Occupational Safety and Health Management System, and the effect of employee capacity (level of education and years of experience) in their participation in Occupational Health and Safety Management System. The objective of this study was to understand effects of employee capacity in implementing the Occupational Safety and Health Management System. Case study design was employed and data was sourced from four different companies within the Lake Turkana Wind Power project. Data collection methods included employee survey questionnaires, key informant interviews, participant observations, focus group discussions and secondary materials. Employee survey questionnaires given to a randomly selected sample of 195 of 380 employees from four companies working to establish the Lake Turkana Wind Power project, online questionnaires to twelve managers drawn from the four companies, six Focus group discussions, interviews to eleven key informants and participant observations were used to collect data. Data collected was analysed using read/reread coding and analysis, while data from employee survey questionnaires was analysed using the statistical Package for Social Sciences tool (Version 23). Chi-square test of independence tested the relationships between variables. Employee's years of experience and not their level of education was found to significantly influence their participation in implementing Occupational Safety and Health Management System. A combination of training with task supervision, years of experience and safe systems of work could have better results. Employees are receptive to a system if they are involved in its development and in its implementation. The research identified a need to close data and legislative gaps within the Occupational Health and Safety field in line with updated international laws, new technologies and globalization. Also, the study recommends improvement of employee capacity wholesomely through supervision, timely provision of safety equipment and proper enforcement safety procedures. Building employee capacity for effective implementation of an Occupational Safety and Health Management System should transcend health and safety training whose design and execution should aim at reducing time and cost incurred by participating companies.

LIST OF ABBREVIATIONS

AS/NZS	Australian Standards/New Zealand Standards management system
BOWEC	Building and Other Works of Engineering and Construction Act (1984)
CWIF	Caithness Windfarm Information Forum
DOHSS	Directorate of Occupational Health and Safety Services
EA	Eastern Africa
EGMF	Enterprise Generale Malta Forrest
ESIA	Environment and Social Impact Assessment
EU	European Union
EU-OSHA	European Union-Occupational Safety and Health Act
FGD	Focus Group Discussion
GDP	Gross Domestic Product
GoK	Government of Kenya
GW	Gigawatts
GWO	Global Wind Organization
HDI	Human Development Index
HS	Health and Safety
HSE	Health Safety and Environment
IET	Institute of Engineering and Technology, The
IFC	International Finance Corporation
ILO	International Labor Organization
ILO-OSH 2001	International Labor Organization – Occupational Safety and Health 2001.
ISO	International Standards Organization
KMPDU	Kenya Medical Practitioners, Pharmacists and Dentists Union
KNUN	Kenya National Union of Nurses
KNUT	Kenya National Union of Teachers
LTI	Lost Time Injury
LTWP	Lake Turkana Wind Power Project
MOU	Memorandum of Understanding
MTC	Medical Treatment Case
MW	Megawatts

NCA	National Construction Authority (Kenya)
NIOSH	Australian National Institute of Occupational Safety and Health
NOHSC	National Occupational Health and Safety Commission (Australia)
OHS	Occupational Health and Safety
OSHMS	Occupational Health and Safety Management System
OSHA	Occupational Safety and Health Act
OSHAS	Occupational Safety and Health Assessment Series
PDCA	Plan-Do-Check-Act
PPE	Personal Protection Equipment
SAZ	Serious About Zero
MSE	Micro and Small scale enterprises
SPSS	Statistical Package for Social Sciences
TBT	Toolbox talks
TNA	Training Needs Analysis
TQM	Top Quality Management
UK	United Kingdom
USA	United States of America
VMS	Vestas Management System
WHO	World Health Organization
WIBA	Work Injury Benefits Act (GoK, 2007).

TABLE OF CONTENTS

TABLE OF FIGURES

LIST OF ANNEXES

CHAPTER 1 INTRODUCTION

1.1 General

This chapter presents the research problem and highlights the background of the problem under study. It examines the research objectives and justifies the need for the study. It points out the significance of the whole study undertaking and defines clearly the boundaries of operation including definition of terms of operation

1.2 Background

Significant decrease in the frequency and severity of Health and Safety and related incidents at the workplace is yet to be realized even in organizations that have implemented Occupational Safety and Health Management Systems. Studies (Robson *et al*, 2005; Adan, 2004; Chen, 2003) show that successful implementation of an OSHMS is dependent on a variety of factors chief among them, management commitment, employee awareness and training, continuous improvement, compliance to updated legal and statutory legislations, availability and accessibility of updated and relevant Health and Safety documentation and proper and effective channels of communication between the different arms of the organization.

Each of the areas mentioned above faces a unique combination of challenges (Robson *et al*, 2005). However, given the difference in sex, culture, level of education and job experience of employees in any particular organization, effective implementation of such a system relies significantly on level of employee awareness to the set OSHMS elements, and how these affect or are affected by their actions. Employee knowledge and awareness on the principles of the OSHMS will be seen in their attitudes, behavior, beliefs, perceptions and the overall organizations safety climate. These are considered immediate outcomes of the systems. The final outcome however would include changes in the occupational injury or illness statistics, employee loyalty to the company, and general employee quality of life. For employers whose primary interest is costs, reduced compensation rates and improved workplace productivity is considered as a final outcome.

Generally, an effective OSHMS should have the following elements: it should be designed with the specifics of the workplace; there should be clear deliberate and documented evidence of commitment from the employer and senior management towards the OSHMS; workers input should be invaluable through the development and implementation process; responsibilities should be clearly spelt out and those responsible held accountable; an

evaluation mechanism has to be documented and executed periodically; and the system elements should be effectively communicated to all workers and managers in the company (Robson 2006; Chen,2003).

1.3 Statement of research problem

By the year 2017, it was estimated that 2.74 million workers die every year due to work related injuries and illnesses. This is up from 2.33 million estimated by the WHO in the year 2014. Of these, 2.4 million (86.3%) are due to work related illnesses and 13.7% are due to work related injuries (Hamalainen *et al.*, 2017). In addition, more than 264 million non-fatal injuries occur every year resulting in an average of above 3 lost work days and 160 million people with work related illnesses (Pearson, 2009). The ILO further believes that the cost of injuries and illnesses cost the world up to 4% of the global GDP which is estimated to $1.25 trillion US dollars (approximately Ksh, 125 trillion).

Within the construction industry alone, ILO estimates that more than 60,000 fatalities occur in construction sites every year. The global trade federation puts the figure higher estimating that more than 108,000 annually (Kibe, 2016). The unique nature of the construction industry, given its temporary nature and the myriad of activities within each construction site makes the workers more vulnerable to the hazards and risks. Major causes of these accidents are identified as the unique nature of the industry, human behavior, difficult work site conditions, and poor work site management which leads to unsafe work methods, equipment and procedures (ElSafty *et al*, 2012). They are as a result of defects in the health and safety management systems.

Kenya's construction industry in general has been marred by reports of fatality and serious injuries during construction as well. Apart from the OHS legislature and subsidiary regulations, many companies do not refer to other relevant international policies and guidelines in order to ensure the highest levels of health and safety management. The bare minimum requirements spelt out within the Occupational health and safety Act, 2007, and other subsidiary legislation, seem to either be ineffective or ineffectively enforced given the continued rise of workplace accidents (Mutemi, 2007). Mutemi, (2007) argues that between 2001 and 2007, there were 1035 occupational accidents recorded within Nairobi County.

In a bid to reduce the numbers of occupational incidents and the costs that come with it, occupational safety and health strategies are developed and implemented. The strategies

are however seen to be complicated, ambiguous, not in line with business strategies, costly, and need further research in order to understand their relevance. Employees are, according to ISO 45000 on occupation safety and health, supposed to play a key role in the development and implementation of these management systems. Their role is however not well understood and often the management take up wholly the role of development and implementation without considering the vital roles played by the employees. Often these systems have failed leaving the consumers more confused and in disregard of occupational safety and health management as a whole (Robson *et al*, 2005).

1.4 Research questions

(i) How does employees' levels of education and work experience influence the employee's participation in implementing the Vestas OSHMS?

(ii) In what ways have adequacies or deficiencies in capacity needs influenced employees participation in the implementation of the Vestas Occupational Safety and Health Management System?

(iii) How do employee capacity gaps influence trends in safety and health at Vestas Eastern Africa Limited?

1.5 Research objectives

1.5.1 Broad objective

The general objective of this study is to understand employee capacity challenges and their role in the effective implementation of the Vestas' Occupational Safety and Health Management System (OSHMS).

1.5.2 Specific objectives

The specific objectives of this study are to:

i. Analyze the influences of work culture, education, gender, age or work experience on employee participation in effective implementation OSHMS at Vestas East Africa Limited;

ii. Determine ways in which adequacies or deficiencies in capacity needs influence employees participation in the implementation of the Vestas Occupational Safety and Health Management System;

iii. Analyze the relationship between employee capacity gaps and in safety and health trends at Vestas Eastern Africa Limited;

1.6 Research hypothesis

Different opinions from different researchers on the same topics requires that these opinions or theories be tested for correctness, accuracy or to check the degree of association between any two variables. This sub-topic introduces the following exclusive schools of thoughts to be tested.

Hypothesis 1:

H_o: There is no significant relationship between employees' education level and their participation in OSHMS implementation.

Hypothesis 2:

H_o: There is no significant relationship between employees' work experience and their participation in OSHMS implementation.

Hypothesis 3:

H_o: Additional training in OHS does not significantly result in the employee's participation in the OSHMS implementation.

1.7 Justification of the study

With limited data available on evaluation of Occupational Safety and health management systems, this study will go a long way to advice companies, and institutions on gaps that need to be addressed before or during the implementation of the occupational safety and health management system in as far as employee participation is involved. Not only will this allow the consumers (companies, institutions, organizations), save on time taken and cost of implementation if their management systems, it will also help them realize their companies OHS goals faster and effectively. Employee dynamics are as different as the number they are. Identifying their specific needs may not only be time consuming and costly, they may also be too diverse to group into manageable functional strata. Additionally, training the employees on the OSHMS, a key element of the management system, will be done targeting possible gaps already identified by this and similar researches. Identifying gaps in this and other strategies will point out reasons why the

strategies fail and guide research into other OHS management strategies which have been tested and approved.

This study will be a tool to be employed by policy makers and the management teams, OHS experts, OSHMS developers and implementers as they seek to ensure that employee involvement in OSHMS implementation within their companies, is beneficial, cost and time effective, and as per the goals of the target consumer.

1.8 Scope of the study

The study was limited to activities in the implementation of the Lake Turkana Wind Power Project in Loyangalani sub-county, Marsabit County. Such limitation was necessary since this is currently the only project that Vestas is involved in in Kenya. The researcher also chose to only focus on the health and safety concerns of the workers within the project and not the residents living within the project.

The Management team, employees and sub-contractor employees of Vestas Eastern Africa Limited were considered for this research. As it was, Vestas had engaged the services of three sub-contractors for her works within the project area (Bollore Africa Logistics, Enterprise Generale Malta Forest and Anipsotiki) to perform various tasks. A number of employees from these companies were sampled as a representation of the sub-contractor awareness of the Vestas Eastern Africa OSHMS. Temporary employees and visitors were be sampled as they, at the time of the collection of data, were not available to give their responses.

The research covered occupational health and safety management during transportation of persons and equipment within the project area, the construction of a total of 356 turbine foundations, erection and installation of the said number of turbines and operations within the Vestas E.A's Camp and the three sub-contractors' camps . This research however did not include management of transportation safety of equipment and materials from the sources outside the project area as these were difficult to control and review since other complex dynamics are involved. The study only focused on activities carried out by Vestas Eastern Africa Ltd which only deals with the on-shore transportation of the turbines and turbine equipment, the construction of the turbine foundations and the installation of the wind turbines and, not Vestas Global, the umbrella company, which is also involved in turbine design and manufacture.

Ways in which communication, management commitment and financial resources affect the employee capacity to participate in the implementation of the OSHMS was assessed. This formed the basis for identification of the implementation gaps and further the recommendation of actions that will ensure improvement and future effective implementation of the system.

1.9 Limitations of the study

The main limitation of studying a project is time. As the project is time bound, the researcher is forced to work within the confines of the time limit set for the implementation of the project. Vestas EA Limited only had one project within the country which meant that the research is not only confined to the geographical and activity scope of that project but was also confined to the two-year time limit contractually set for the completion of the project. The researcher therefore had to dedicate most of her time to identifying the key respondents, gaps of the OSHMS, organizing the focus group discussions, and face to face interviews largely depending on the available time for the respondents which was to a large extend limited. Collecting and reviewing as much data as possible within the time given was key in mitigating the limitation.

Sourcing for information within the company in order to generate secondary data for the project was another challenge faced by the researcher. As a big company with a strict code of conduct in regards to privacy, the management were not forthcoming with information. They sought permission from the Vestas Global Management which always took time away from the already limited time. In some instances, the request for this information was rejected siting company policy even though the information would have been valuable to especially map the Vestas Global OSHMS strategies implementation trends. To manage this limitation, the researcher always used official communication channels in order to seek the necessary approvals. In addition, the researcher was to state a disclaimer, absolving the company and associating companies and institutions from the views of the researcher.

1.10 Operational definitions

Accidents: work related accidents happening either within the workplace or *en route* to perform duties or from performing duties as stated by an employer.

Injury: Any physical harm on an employee within the workplace or related to the employees place of work.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

Whether it is thought that major accidents leading to loss of many lives, or smaller accidents in the workplace leading to loss of life or injury to individuals, an organization's safety culture is almost invariably a major factor leading to the event (Institute of Engineering and Technology-IET, 2017). Safety culture in any organization is defined as the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's health and safety management (HSE, 2005).

The International Labour Organization simply defines OSHMS as "*a set of interrelated or interacting elements to establish OHS policy and objectives, and to achieve those objectives"* (ILO-OSH, 2001; Pg. 13). Other publications define OSHMS in a broader more specific way as is seen in the Australian-New Zealand OSHMS standard AS/NZS 4801:2001. OSHMS is defined in this case as:

"*…that part of the overall management system which includes organizational structure, planning activities, responsibilities, practices, procedures and resources for developing, implementing, achieving, reviewing and maintaining the OHS policy and so managing the risks associated with the business of the organization*." (AS/NZS 4801:2001; Page 4)

The earliest reference to safety at the workplace dates back to 1750 from the Code of Hammurabi, which states that the builder of a house would be put to death if poor construction leads to the death of the owner (Marwowski, 2001). Since then, there has been a growing concern on the safety of the inhabitants, and general public, and most recently, the safety of the workers. Over the past 20 years, a variety of OSHMS-based standards, guidelines, and audits have been developed. These include the Occupational health and Safety standards in the Philippines, 1989, British Standards Institution, 1996, 1999, HSE, 1997, ILO, 2001 and Standards Australia and Standards New Zealand, 1997 and most recently ISO 18001:2007, an Occupational Health Safety Management System (OSHMS). In as much as these standards are significantly different, they have been designed with the same goal-to manage safety and health issues at work.

OHS experts, management and employees agree that the poor working conditions which includes inadequate premises and unsatisfactory welfare facilities, and the practically non-

existent occupational health services cause large human, financial and material losses worldwide. "The magnitude of global impact of occupational accidents and diseases, as well as major industrial disasters, in terms of human suffering and related economic costs, has been a long-standing source of concern at workplace, national and international levels (Machida, 2010, pg 14)". ILO estimates that about "2.78 million workers die each year from work related accidents and diseases" which is higher than what was recorded in 2014 (2.3 million). Fatalities from work related diseases are five times higher than those from work related accidents. By 2017, it was estimated that 7,500 people die each day from work related accidents or illnesses; 6500 from work related illnesses and 1000 from work related accidents (Hamalainen et al., 2017). A breakdown of the estimated fatal work related mortality by the cause of the fatality in the year 2015 is as shown in fig 2.1.

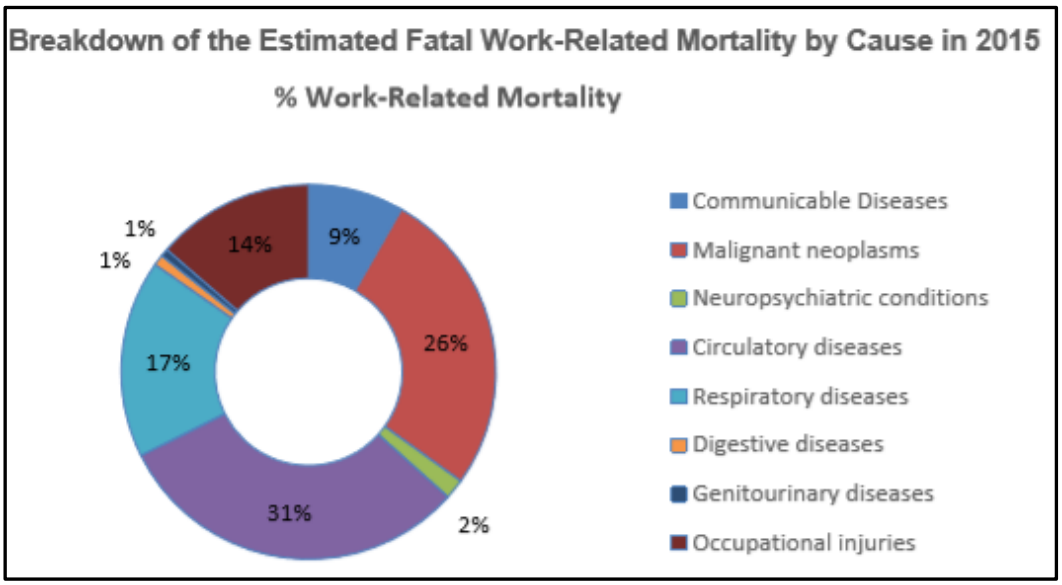


Figure 2:1: Breakdown of Estimated Fatal Work-related Mortality by Cause in 2015.
Source: Hamalainen et al. (2017)

2.2 OSHMS: Purpose, functions and intended outcomes

It is commonly agreed that the various OSHMS are distinguished from the traditional OHS programs. They are seen to be more proactive, better internally integrated which aides in incorporating the elements of evaluation and continuous improvement (Robson *et al.*, 2005). In addition, OSHMS are systematic in the sense that their implementation and operation basically follow steps as indicated on Figure 2.2:

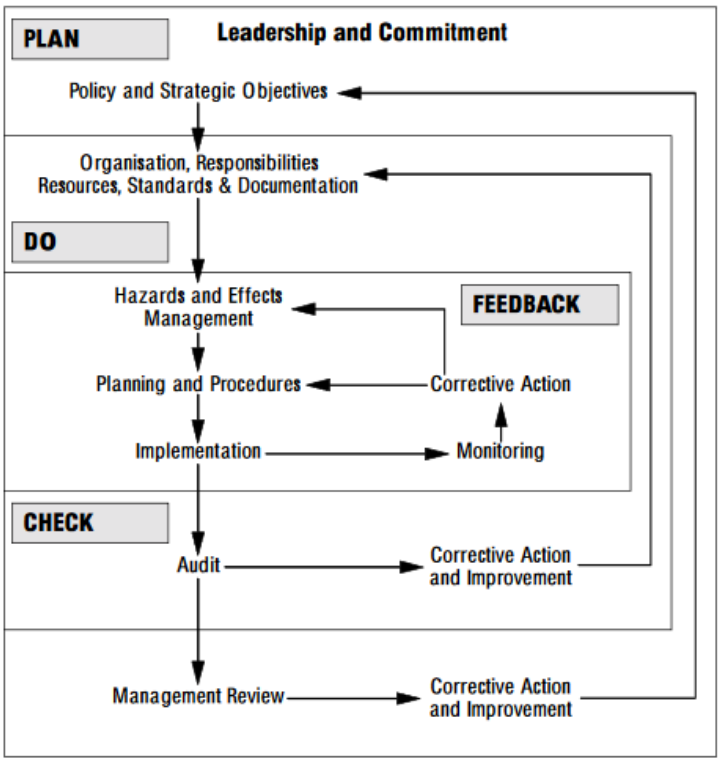


Figure 2:2: Flow chart showing the various vital elements of a OSHMS
Source: Pearse et al (ed), 2001

Generally, the Plan-Do-Check-Act phenomenon simply referred to as the PDCA, as shown in the figure 2.2. The PDCA is a framework which provides systematic approach to solving problem and for continuous improvement. It originates from the Walter Shewart and Edwards Deming's articulation of iterative process whose aim was to test interventions or changes in a complex system. The PDCA cycle is preferred as it provides rapid assessment and gives flexibility to adopt to change according to feedback and practical and applicable solutions are developed (Taylor M. *et al*, 2013).

Some researchers (Goh *et al*, 2012; Robson *et al*, 2005;), opined that OSHMS implementation may not be as successful as one may imagine. Goh *et al* (2012) puts the success rate of OSHMS as high as that of the Quality Management system placed at between 63% and 93%. They both site inadequate management commitment, poor information dissemination and inadequate employee participation as possible hindrances to success. Other possible hindrances were identified as the high level of rigidity and formalization which is a requirement of the implementation of OSHMS. Additionally, Robson *et al* (2005) points out that there may be other factors that influence the success of OSHMS such as type of industry, the size of the industry, and work organization and arrangement.

On the other hand, Bakri *et al* (2006), supports the effective implementation of the OSHMS (OHSAS 18001). In their study, they state that many occupational accidents and injuries are as a result primarily of a breakdown or inadequacies of existing OHSAS 18001 management systems of the non-existence of the system. Gallagher *et al* (2001) additionally collected evidence, in the mid1990s, from twenty organizations that had implemented an OSHMS. Analysis of the findings suggests that safe place industries (adaptive structured hazard managers) are better than safe person enterprises (unsafe act minimizers).

2.2.1 OSHMS in developed countries

Developed countries invest more significantly in OHS in comparison to developing countries. The genesis of OHS Management being traced back to trade unions and community pressure after many reported workplace injuries and fatalities (Jilcha *et al*., 2016). In the European Union, for instance, in the year 1824, the fist worker's union was birthed, whose aim was to improve working conditions by reducing work schedules and protecting female and child workers (Gagliardi *et al*., 2011). Rarely mentioned however is the presence of the political mechanisms in developed countries which translate scientific findings into enforceable policies and legislature.

The United States, one of the most developed countries with high OSHMS, reported 6,026 fatal work injuries and approximately 3.8 million non-fatal injuries in 1998. This resulted in an estimated 80 million production days lost for that year and almost 60 million days in future years (Bureau of Labor Statistics, 2000; United States Census Bureau, 2000). Gallagher *et al*, 2001, documented a set of studies done by various researchers. The first study, a three-stage study by researchers at the U.S. National Institute of Occupational Safety and Health (NIOSH) which aimed to define the features of firms with better health and safety performance. A number of factors were identified in this research, (as well as in other studies) which links health and safety management practices to injury outcome data. The critical role played by senior managers in successfully implementing health and safety management systems and effective communication, employee involvement and consultation, were the recurring findings.

A developed country with a Human Development Index (HDI) of 0.93, Australia introduced and developed its OSHMS due to various reasons. First, there was, at that time, a growing use of OSHMS in other countries due to disasters like the Piper Alpha oil rig

fire that occurred in the North Sea approximately 120 miles (190 km) north-east of Aberdeen, Scotland. This indicated a deficiency in the previously adopted OHS strategies and pointed out the need of a more structured management system. Secondly, the previously adopted Total Quality Management (TQM), for the purposes of business enhancement seemed to work in achieving companies' objectives. The experience with TQM guided the adoption of the OSHMS by the Australian National Occupational Health and Safety Commission (NOHSC).

The growing use of the OSHMS was seen due to public policy. Australia adopted the voluntary approach as opposed to the mandatory approach that has been adopted in European countries. State and territory governments have publicized recommended OSHMS criteria and have introduced incentives allowing enterprises the 'self-insurer' status if they demonstrate effective implementation of the OSHMS. This was in a bid to ensuring a more secure workplace (NOHSC, 2001).

Very little information on the effectiveness of the Australian OSHMS is available (NOHSC, 2001). However, lessons from other studies such as from the U.S National Institute of Occupational Safety and Health can be drawn. A number of factors were identified which linked safety and health management practices to injury outcome data (NOHSC, 2001). The study further identified the critical role played by management commitment, effective communication and employee participation. Other studies (Guastello, 1991; Eisner *et al*, 1988;), however, showed no relationship between international Safety Star Rating and Injury data.

2.2.2 OSHMS in developing countries

Occupational health and safety is neglected in many developing countries due to the pressure of political, economic and social challenges (Jilcha *et al.*, 2016) Additionally, it is estimated that workers in developing countries are exposed to 80% of the global occupational hazards (Khan, 2014). A World Bank study on working culture stated that a factory worker in Pakistan, a developing country is 8 times more likely to be killed in a factory accident than one in France; a transport worker in Kenya is 10 times more likely to be fatally injured than a transport worker in Denmark; while a construction worker in Guatemala is 6 times more likely to be killed than one in Switzerland. The poor OHS performance has been linked to the fact that most countries and industries do not recognize OHS as part of their national or company development goals (Puplampu *et al.*, 2012).

Additionally, in developing countries, majority of the workforce is employed in small and medium enterprises which do not meet the guidelines set by ILO and WHO on workers' Health and Safety Management.

Lack government interest in OHS, weak enforcement of Safety and health and inadequate data and poor data collection systems further hampered OHS development in these countries (Jilcha *et al.,* 2016). As such these countries do not mainstream OHS as part of their National agenda. Apart from little research conducted especially in developing countries, there is an acute lack of literature on OHS (Puplampu *et al.,* 2012). Never-the-less, several steps have been taken to protect the safety and health of workers. OHS interventions such as OHS research, OHS legislature, OHS industrial practices have been introduced. Structured, auditable OHS interventions are however, to a large extent still lacking. Furthermore, the continued importation of both obsolete technologies and new technologies, chemicals and machinery into developing countries is hampered by the sufficient transfer of technology in order to ensure safe work management. This results in the exposure to dangerous machinery and chemicals which results in workplace accidents, injuries and diseases (Onyoyo *et al* 1998). The high rates of unemployment, economic liberation, poverty and structural adjustment programs worsens the challenges in health and safety management making workers extremely vulnerable to unsafe work. Workers, are therefore left with hardly any right or choice to better to working conditions.

A study conducted by Jilcha *et al* (2016), grasped that in developing countries, industries put OHS policies in black and white in their offices without a plan for execution. In some cases, however, a different approach is seen. Research on tanning industries across South East Asian Countries (India, Indonesia, Nepal, and Sri Lanka), indicated that the management of safety and health in the workplace was poor. There was then developed a "know-how through show-how" strategy to spread the concept of managing the environment, productivity, and OHS which was implemented in a few tanneries that were then used as baseline for the demonstration and training of good practice (Hogstedt *et al.,* 2000). Due to its speed in economic development, and the subsequent growing concerns in worker health and safety, Malaysia put more emphasis on OHS development. Sungai Buloh Bright Sparkler firework factory explosion in 1991, initially drove the development and implementation of the Malaysian Occupational Safety and Health Act of 1994. The regulation imposes a penalty positively related to unsafe working conditions (Auyong, 2015) which implies significant government influence on good OHS strategies within

companies. In as much as the Malasysian OSHA Act 1994 is not mandatory and the regulations are placed at the mercies of the industries, a number of industries have opted to implement the OSHMS which has seen a reduction in the number of accidents (Tan *et al* (2015). A study by Omran *et al* (2008), revealed that 85.3% of the 58 participating companies responded that adoption of the OSHAS 18001, the more popular of the OHS Management systems, had a hand in the success of managing OHS. 80.9% noted a reduction in costs of accidents, 67.7% saw and enhancement in the company image while 27.9%) saw an increase in business opportunity.

Diugwu *et al* (2012), identified a safety and health gap in Nigeria, a result of a seemingly ineffective Health and Safety law, which causes a lack of health and safety regulation in almost every sector in the country. The promulgated laws, such as the Factory Act, are non-functional and skeletal. Additionally, implementing these laws is a hurdle given that they originated from the USA and the UK. The contractors in Nigeria have been left to manage Health and safety issues in their own discretion. As a result, they allocate very little resources to the management of safety and health, rarely keep safety and health reports, or release any accident and injury reports that occur at their work places. The implementation of the OSHMS (Diugwu *et al*, 2012), demonstrates the preparedness of an organization to minimize the severity and frequency of work-related accidents, injuries, ill-health and damage to property, citing that the aspects of the OSHMS promotes awareness of aspects and responsibilities of safety and health. OSHMS highlights the impact of poor safety and health standards on an organization's performnce.

More than 6000 work related incidents occur annually in Kenya (Onyoyo *et al.*, 1998). These cause significant personal injuries and loss of property. However, after the implementation of the Occupational Health and Safety Act of 2007 and the new Constitution of Kenya, workplaces had to develop the required safety and health management mechanisms so as to improve the working conditions and escape liability. Currently, OHS is governed by the Occupational Safety and Health Act, 2007 and the Work Injury Benefit Act, 2007. While OSHA, 2007 guides the provision of a healthy and safe working environment, WIBA 2007, is provides compensation to workers in the event of work-related injuries. OSHA 2007 is fairly straightforward and it outlines 3 obligations on employers: to provide a healthy and safe working environment; to comply with stated occupational health and safety standards; and to keep records of occupational injuries and illness under OSHA 2007.

As comprehensive as the regulations in Occupational Safety and Health in Kenya are, the Directorate of Health and Safety Services (DOHSS) lacks capacity to undertake their mandate. Research gaps are seen in the number of accidents and incidents countrywide, the causes of such incidents and accidents and corrective actions that may improve safety and health in the construction sector. Contractors, owners, and regulatory agencies are obliged by law to create a safe work environment and minimize injuries. The success of this law should however be seen through reduction and minimization of the number of incidents within the construction site. This is however not usually the case.

Kemei *et al,* 2014 conducted a research on 41 construction sites within Nairobi province. The result of the research showed that within any specific year, out of a population of 6529 employees, 571 cases of injuries of varying severity were reported. Out of these, 4 were fatal. This would indicate that Kenya experiences 64 fatalities out of 100,000 employees compared to the UK that experienced 0.44 fatalities per 100,000 employees, China experiences 3.8 fatalities per 100,000 employees and South Africa experiencing 25.5 fatalities per 100,000 employees, in construction sites. The causes of these injuries were also assessed. 12% showed a reluctance to provide resources for safety, 12% identified the lack of training, another 12% identified a lack of enforcement of the set rules and regulations, 11% noted a poor safety consciousness among the workers and another 11% a lack of strict operational procedures in construction sites. All in all, in Kenya, no reliable data exists on accidents cases within construction. A reason for this has been that many if not most contractors fail to report the accidents (DOHSS Annual Report, 2011). According to the Labour Commissioners Annual report for the period 1st January to 31st December 2016 stated that KSh49.8 million was paid out as compensation to the aggrieved parties that reported their cases.

The Kenya National Occupational Safety and Health Policy in summary outlined the following: that there is weak dialogues between employees and employers on safety and health issues both in public and private sectors; that there is no reliable system of collecting, compiling and notifying of the occupational accidents and diseases hence limited occupational safety and health information to enable necessary intervention; that the OSH standards in micro and small scale enterprises (MSEs) are low due to their temporary nature, high mobility and small capital base of the enterprises. Additionally it highlights the inadequacy of funds provided by the government budgetary allocations as a key challenge to effective OSHA 2007 requirements implementation (GoK, 2012).

2.3 Employee participation in OSHMS: rationale, successes and failures

The participation of workers in the workplace is seen to have originated during the emergency of industrializing the capitalist societies traced back to the industrial revolution. At the time, workers lacked control of the labour process. Efforts were made to democratize general workplace management (Chen, 2003). Workers, since then, have been seen to participate in various decisions with affect their workplaces. This began in the capitalist societies and later was adopted by a number of socialist societies. As far as organization of workplaces is concerned, quite a number of literature exists that supports the involvement of workers in decision making for effective OSHMS implementation. Over the past century, researchers (Gunningham, 2008; Frick *et al*., 2000)have proposed an occupational health and safety intervention, to engage employees in health and safety matters, with the expectation that this engagement process will improve the occupational health and safety performance, thereby impacting positively on the initiative of the reduction of workplace mortalities.

According to the European Agency for Safety and health at work (2002), OSHMS effectiveness relies on the participation of worker in creating a good working environment and controlling the work related hazards. Long term damage and ineffective behavioral control systems as opposed to singular incidents are the cause of workplace accidents. Full worker's participation is not limited only to consultation with the workers and their representatives but should also include their thoughts in the decision making process. However, some researchers pointed out the fact that, in as much as employee participation is explicitly detailed on paper, employers tend to overlook this and focus on production often overlooking the health and safety of the workers (Xue *et al*., 2017; Diugwu *et al.*, 2012).

Diugwu *et al.,* 2012 additionally noted that employees seemed to be aware of the companies' health and safety management system when interviewed. The researcher however noted that evidence from a site visit indicated otherwise with workers seen not to follow what they already know in their documented OSHMS. Deficiency in employee participation is in two areas: firstly, employees are not involved at all levels in decision making within the various aspects of the work processes and activities. Secondly, managers do not encourage and support employee involvement in managing health and safety. Diugwu *et al* (2012) further noted that if changes that affect safety are made

without seeking employee input and involvement, organizations find it difficult to continuously improve OHS performance over time

2.3.1 Employee involvement in OSHMS: developed countries

According to Abdullah *et al.* (2009), empowered workers who played an active role in safety and health could result in health and safety performance improvement. He noted a study that was conducted in the manufacturing sector in the UK. The results of the study identified employee involvement and good physical working environment are the main contributors to a safe organization. Further, comprehensive safety and health policies and safety training for the employees played were vital in the reduction of accident rates. He concluded by stating understanding the perception of employees on safety and health improves the safety performance.

Gallagher *et al* (2001), points out a research conducted by Painter and Smith in 1986 in Canada. In their research, they studied the development and operation of a participatory hazard and safety management for 4 years. The program was implemented in 6 camps of a Canadian logging company. Aspects of the program analyzed the degree and impact of employee participation. A 75% decrease in the frequency of accidents was seen. Another study in the USA, showed a reduction of injuries reported over a nine-year period following employee involvement in problem solving (Gallagher *et al* 2001). Further, Gallagher lists research by Riley (1995) in the UK. The results of this research demonstrated that enterprises whose safety and health committee members were selected by workers had a lower safety and health incidence rates in comparison to those whose committee members were selected by the management. In all these, Gallagher pointed that, effective employee involvement was impossible without the commitment of the management to employee involvement programs, suggesting that a 'joint regulatory' relationship exists between the workers' representatives and the management representatives to ensure success of the programs. Interesting to note were the organizations that implemented the government approved OSHMS, but were reluctant to discuss OHS with the employee representatives. Implementation of the off-the-shelf OSHMS and other OHS management tools were identified by several workers' unions within the UK as a major hindrance to effective involvement of employees in OSHMS implementation and operation. All in all, the research concluded that, for an OSHMS to be effectively implemented it is vital to ensure there is employee participation, the

participation and commitment of senior management and an integration of the OSHMS into the general organizational systems (Gallagher *et al.*, 2001).

Examples of programs within the USA that have been applied for the purposes of encouraging employee participation includes the use of collective bargaining through Workers' Union or Trade Associations (Brijlall, 2015). Representatives of trade unions can form partnerships with Line Managers in order to find ground on which to discuss health and safety of the workers. In the recent years however, employers are promoting the use of the work committees that focus on increasing operational efficiency and improving the quality of the products and services, with the result health and safety issues have taken a back seat.

OHS legislation within the USA has also to a large extent been applied in encouraging employers to support OHS promotion programs which require a working relationship between the employers and the employees working together to identify hazards, assessing the risks and implementing mitigating actions to eliminate or reduce these occupational risks for it to succeed (Brijlall, 2015). The USA legislation endeavours to engage employers and employees, voluntarily, with the objective to ensuring the occupational health and safety of all stakeholders within the workplace. The employees are given power to elect their own representatives in a democratic environment, who will be charged to bring the employer any notices of unsafe acts or conditions which pose a threat to the health or safety of the employees.

Success in employee participation in OHS has to the largest extent been seen through the bargaining relationship between unions and employers. Despite the differences between unions, employers, governments, cultures, value systems, legislation and economical wealth, evidence indicates that, OHS participation through joint labour-management committees have been instrumental in improving organizational safety performance (Brijlall, 2015).

In Canada, each of the Canadian states have developed their own Safety and Health legislature for the purposes of managing safety and health (Ontario Occupational Health and Safety Act of 2010, the Manitoba Workplace Health and Safety Act of 2010 and the Saskatchewan Occupational Health and Safety of 1993). These legislation propose fairly different approaches towards the management of safety and health. In Ontario, the legislation, prescribes the mandatory establishment of health and safety committees in each

workplace that has 20 or more employees, and that these committees are composed of members of both the management and the employees for the purposes of managing health and safety risks of the different workplaces.

In Manitoba, similar to Ontario, a health and safety committee is formed composing of both management and employees. However, the difference comes in the fact that while in Manitoba, any disputes within the committee are settled by the government through the Ministry, in Ontario, the government plays no role in dictating how the health and safety committee is run. In general, Canada prescribes that a health and safety committee is formed within each organization, that is composed of both management and employee representatives, for the purposes of managing health and safety.

Research aimed at studying the effectiveness of worker participation in health and safety decision making, have shown that certain structural determinants such as the active enforcement by the workplace Inspectorate, the workplace standards and the joint decision making by labour and management on occupational health and safety matters have impacted positively on the OHS. Further research concluded that the failure in worker participation can be attributed to the declining union numbers, the lack of legislative standards, weak enforcement systems, and the lack of training (Brijlall, 2015)

Brijlall, (2015) further studies research undertaken in Europe as regards employee participation in OHS management. Research indicated that in as much as Norway, Germany, Finland and Denmark, were known to be highly unionized, and had strong traditions for employee participation in the workplaces, in practice employee participation in OHS is less than is stipulated in the Legislation. This has been attributed to employees seeing OHS as a separate matter to industrial relations, and that organized labour utilizes OHS as a bargaining tool rather than embark on a jointly coordinated effort to improve OHS.

A comparative study conducted within seven states, France, Germany, Greece, Ireland, Italy, Spain and Sweden, demonstrated that the effectiveness of the worker participation is strongly dependent on the establishing trade unions and their support structures as a powerful influence within the work environment, the initiation of training programs covering occupational safety and health matters, the overwhelming significance of management's commitment, the need to improve safety at the workplace, the consultative approach that exists between safety representatives, and the workers and line management

(Brijlall, 2015). Further, that the factors that influence workplace representation negatively are associated with the economic downturn, the declining power of trade unions and decreasing membership of trade unions, the lack of legislative standards, weak enforcement systems, and the lack of employee training in OHS.

The voluntary approach to managing OHS is used in Britain and the combined legal-voluntary approach in Denmark, have been successful in encouraging employee participation improving OHS outcomes. The employee participation within these two countries is discussed in more detail in legislation, as the subtle differences have enhanced occupational health and safety at the workplace within their respective countries.

In New Zealand, just like in Kenya, Nigeria, the UK, the US and other countries, employee participation is enshrined in their national legislature (Diugwu, 2012;, EU-OSHA, 2012; GoK 2007; Harris *et al*., 2011;). Through their Safety Representatives or Trade Unions, the employees have been, on paper, given a platform on which to participate in managing their companies' health and safety programs. However, just like in other countries (Xue *et al.*, 2017; Diugwu *et al.*, 2012; Harris *et al.*, 2011,), the New Zealand legislation is not explicitly and effectively practiced among the companies as dictated by their law. Some research (Diugwu *et al.*, 2012; Harris *et al.*, 2011;) suggest that the industry context or culture has higher influence in this. Consequently, there is the likelihood that the employees and their representatives be denied these legal rights and will not have avenues through which to obtain redress.

2.3.2 Employee involvement in OSHMS: Developing countries

Thakur (2014) studied the worker participation in decision making in regards to management in India. The research aimed at ascertaining the workers' level of involvement, establishing attitude of workers towards participation of workers and determine the factors that hinder the observed level of participation. He argues that for the productivity level of workers to grow, it is paramount that the workers are involved in decision making. Thakur, 2014 goes ahead to suggest that the increasing interest to have workers participate in decision making could be attributed to a number of factors: real or anticipated pressure politically designed to extend the popular democratic dispensation in the larger society to the economic sphere; the growing pressure from the collective bargaining agreement system, arising from negotiation challenges in the context of high inflation; the problem in the modern industry systems which encourages workers to

experiment with the different forms of participation and lastly, the problems associated with denying powerful groups (such as the worker groups') the legal and formal means to exercise their rights.

Further on, Thakur (2014) cites researchers (Imaga, 1994, Adewumi, 1993 and Fashoyin, 1992,), who suggest that worker participation reduces industrial conflicts, raises the productivity of workers and ensures a rapid development socially and economically. In addition, he argues that CBA is the only avenue in India for worker participation in management to be achieved. However, this machinery has proved to be defective due to its restrictive nature.

In China, a fast developing country, research noted that within the organizations, there is a significant power difference, culturally, between the inferiors and the superiors (Xue *et al.* 2017). This leads the managers of organizations to have a more centralized approach to decision making. Such a culture encourages compliance with senior management but stifles worker's challenges. As such employees, most often have no voice even in that which concerns them (Xue *et al.* 2017). Conflict between employee involvement and press for production often led management to make decisions that support production and often overlooking the suggestions of middle managers or employees. Middle managers were seen not to be explicitly in charge of their teams, and their decisions were only respected if these decisions are in line with the views of the senior management and overall company's commercial interest. It could be concluded that organizations prioritized profits over health and safety of the employees. Another study (Ghahramani, 2016) noted that companies which implement OSHMS as a means to control Health and Safety Management performed better in terms of employee perception to the program than those which implement the OSHMS for certification purposes. It is also vital to note that employees who receive health and safety training had a better perception towards OSHMS than those without this training (Ghahramani, 2016). However, on involvement of employees in decision making on Safety and Health, many were of the opinion that the OSHMS procedures were daunting with most having little or no information about the system. Interviewees were however quick to point out that involvement of employees in the implementation of this system was paramount as it shortens and quickens the process of translating the paper based instructions into a more practical use. Key hindrances to effective employee participation included a poor attitude towards safety, the fact that workers do not generally see the need for participation in OHS management and health

management systems, lack of job satisfaction, and lack of motivation to embrace OHS management strategies.

South Africa experiences fatalities every day in different facets of the society which have social, financial, and personal costs. Within the OHS legislation laid down (Mines Safety and Health Act 1996, Compensation for Injuries and Diseases Act. and the Occupational Safety and Health Act, 1993), companies still aim to maximize of profits which means minimizing on OHS requirements. OHS requirements outlined in the South African legislation prescribes the bare minimum requirements which most organizations adhere to, leaving best practice in regards to OHS to be implemented by larger more established organizations (Brijlall, 2015). The legislation according to Zimmerman (2005) aims to give employees legislated rights to conduct inspections, investigate accidents, approve employer's occupational Safety and Health programs, participate in educational programs paid for by the Employer and stop work because of unsafe or unhealthy conditions.

A study undertaken in the South African mining industry confirms that in order to ensure the OHS programs are implemented successfully, the response of workers to safety measure, the discipline and the strategies employed by government agencies in the enforcement of legislation are a pre-requisite (Brijlall, 2015). Further, the South African's National Union of Mine Workers, argue that one of the key reasons that OHS legislation is failing is the lack of adequate funding for inspectors to carry out their duties and the lack of training and experience of inspectors.

An improvement in the level of education through training and education, worker participation in the process of safety decision making, an improvement in the level of technology and mechanism at the workplace, and greater enforcement of legislation were all identified by Zungu *et al.*, (2007) as pre-conditions for South Africa to be able to realize a reduction in workplace injuries, accidents and fatalities. As regards to the relationship between management and employees, the view and interests of both parties is not always coinciding. As part of the cost cutting exercise by management, OHS often takes a back seat and is often overtaken by maximization of company profits.

Although the OSHA Act, 2007 explicitly states that employees are to be involved in managing Safety and Health evidence in literature to support this being actualized by employers is to a large extent lacking. The Act, clearly states the duties of the employees to include, reporting of dangerous occurrences to management, adorning the appropriate

Personal Protection Equipment (PPE), ensure his actions do not jeopardize his or his follow workers' safety, report any injury or harm that has occurred at the workplace among others. Additionally, the Safety and Health representatives have the mandate to represent the employee's Safety and Health needs to the management after which they should not be discriminated against (OSHA, 2007). Employees, according to the act, are also involved during the statutory Safety and Health audits, and collection of occupational Safety and Health statistics.

Through the workers' union, however, such as the Kenya National Union of Teachers (KNUT), Kenya Medical Practitioners and Dentists Union (KMPDU), Kenya National Union of Nurses (KNUN) Safety and Health issues have at times been put in the fore of grievances tabled by these employees. Noted, was that there were 5,660 medical doctors by the year 2015 (The Daily Nation, Sunday May 14th 2017), 55,091 nurses by the year 2012 (GoK, 2012), 242,071 teachers employed by the Teachers Service Union (The Daily Nation, October 6th 2015), while there are 511,676 construction workers (National Construction Authority, 2012). Especially with their large numbers, a union to fight for the needs of the construction workers is however, yet to be established. The temporary nature of construction, especially in small-scale construction company, with the inability to employ workers on a permanent basis, also contributes significantly to the inability of workers to organize themselves into workers' associations which can champion for their rights.

More often than not, however, these worker's unions table grievances related to the workers' remuneration as opposed to their general health and well-being. This could imply that the workers or employees directly link their remuneration to their safety and well-being at work. It could also imply that, the workers are looking to another body or bodies such as their trade unions to take care of their health and well-being directly.

Research on the involvement of workers in implementing OSHMS or their general involvement in the management of OHS in their companies' is lacking to a large extent. Accessibility of this data was an uphill task with few related data on Safety and Health information either retrieved from public documents (National Profile on Occupational Safety and Health, ILO, 2013) or student study reports (Gaceri, 2015; Kaguathi, 2013). None of these documents, however, looked in depth into OSHMS implementation nor the role that employees play in OSHMS implementation or general OHS management.

In summary, in both the developed and the developing countries, it is clear that these countries all recognize through legislation that employee participation is key in order to ensure effective implementation of OHS programs including the OSHMS. Unfortunately, factors such as focusing on profits above OHS programs, enforcing OHS legislature mandatorily as opposed to voluntarily, lower education levels among the workers, lack of training of the enforcement authorities hinder the success of such programs.

2.3.3 Applications of OSHMS in the Lake Turkana Wind Power Project

The Lake Turkana Wind Power Project: A brief history

The principle investors of the LTWP first visited the project area in the year 2005 to visualize the project and gain better understanding of such a possibility. After numerous meetings with the national authorities and being given exclusive rights to study the wind resources of the wind resources in the area, a Memorandum of Understanding (MOU) was then signed between the principle investors (LTWP ESIA, 2007). During the next twelve months, wind measurement was carried out. In the same year, a detailed route assessment was carried out from Mombasa seaport to Loiyangalani, the project location, in order to understand the effort required for logistical operation of transporting the masts and turbines. An initial assessment of the national grid was also done before a meeting was held between the partners and Kenya Power Company Limited, where a letter of interest to purchase the power generated by the Lake Turkana Wind Power project was subsequently issued.

The primary objective of the LTWP is to construct the LTWP wind farm and generate electrical energy that will be channeled into the national grid. Initially, the projects was intended to construct 100 wind turbines, each of which would generate 3MW of energy which would result in a total of 300MW of energy (30% of the National capacity in Kenya as in 2006). An alternative was the construction of approximately 300 wind turbines, each with 1MW generation capacity.

The LTWP is found within north-western Kenya, bordering the south eastern part of Lake Turkana. Through the ‘Turkana Corridor’ winds starting in the Indian ocean sweep the area at The winds sweeping the area start in the Indian Ocean moving consistently at an average of 11 miles per second. The general lack of human development within the area, consistent wind makes area ideal for the harnessing of wind energy. The scope of the

project, in addition to the 365 wind turbines, a 426 km power transmission lines, a substation and 200 km or road re-habilitation was also done.

OHS management strategies in LTWP

The overall OHS responsibility for the project was Worley Parsons on behalf of the client LTWP. Worley Parsons has an ambitious goal in regards to Safety and Health of 'Zero Harm' through their One Way program. In this program, Worley Parsons strongly advocated for dialogue as the main tool used to champion for effective Safety and Health management. The management was however not clear on which management system they are aligned to. However, it was very clear that they have clear OHS strategies that have been employed in all their offices globally. These strategies gained them a prestigious award the ExxonMobil Development Company President's Safety, Security, Health & Environment Award in both 2015 and 2016.

As part of their management strategy for OHS, Worley Parsons insisted that all the contractors should be ISO certified (ISO 9001:2001, Quality Management Standards). Worley Parsons also insisted that these contractors are to have their own elaborate OSHMS without necessarily stating which management systems were preferred. Vestas Eastern Africa Ltd, was however, already ISO 18001:2001 certified.

2.4 OSHMS for Vestas Eastern Africa Limted

Vestas Eastern Africa Ltd, as was earlier stated is part for the Vestas Global Company which was started in the year 1898 (https://www.vestas.com/en/about/profile#!history accessed on 19th May, 2018 at 11:46am). Vestas global developed the Vestas Management System (VMS), which is an integration of the quality, environment and Safety and Health management systems. The VMS, which was also applied in the LTWP, has procedures and standards for incident management, contractor safety, safety induction programs, electrical safety, and risks and opportunities as their overall safety standards. Using these as precedence, and with the aid of the global Vestas OHS manual, the HSE teal at the LTWP customized and developed their own OHS management strategies: HSE Training and Competence, HSE audits and inspections and HSE participant management. The team was, through these strategies, able to implement the Vestas Global OSHMS within the project.

The choice of employing the ISO standards, was however not clear and sourcing for this information was not fruitful for the researcher. This, the researcher attributed to the size

and spread of the company globally. One of the management team members, however suggested that the choice of applying ISO 18001 was because the company had previously been certified for ISO 9001. Applying any other standard would be a challenge to integrating the system into the VMS that was developed.

2.4.1 OSHMSs in wind energy development

Being that the research focuses on companies engaged in construction of a wind farm, the researcher studied literature on OSHMS in wind industry. According to Global Wind Energy Council (2014), the last 15 years, the length of wind turbine rotors has increased significantly.

Currently more than 90 countries have developed wind power stations. By the end of the year 2013, 318GW (3% of electricity globally), had been installed (Global Wind Energy Council, 2014). The capacity for wind power annually saw a growth rate of 21.4% since the end of the year 2008. Over the past decade, this capacity has increased eightfold, (Renewables 2014 Global Status Report). Wind power, is therefore ranked as the power source with the fastest growth technologically and in terms of its spread. (Global Wind Energy Council, 2014).

With the increase in the number of wind farms that have been constructed, there has also been seen a steady increase in the number of incidents within these farms. Figure 2.3 shows the increase in the number of incidents with the growth of the wind industry. This is despite the fact that over the years, several organizations have been established in order to specifically manage Safety and Health in the wind industry (Global Wind Organization, Renewable UK, New Zealand Wind Energy Association, Irish Wind Energy Association among others).

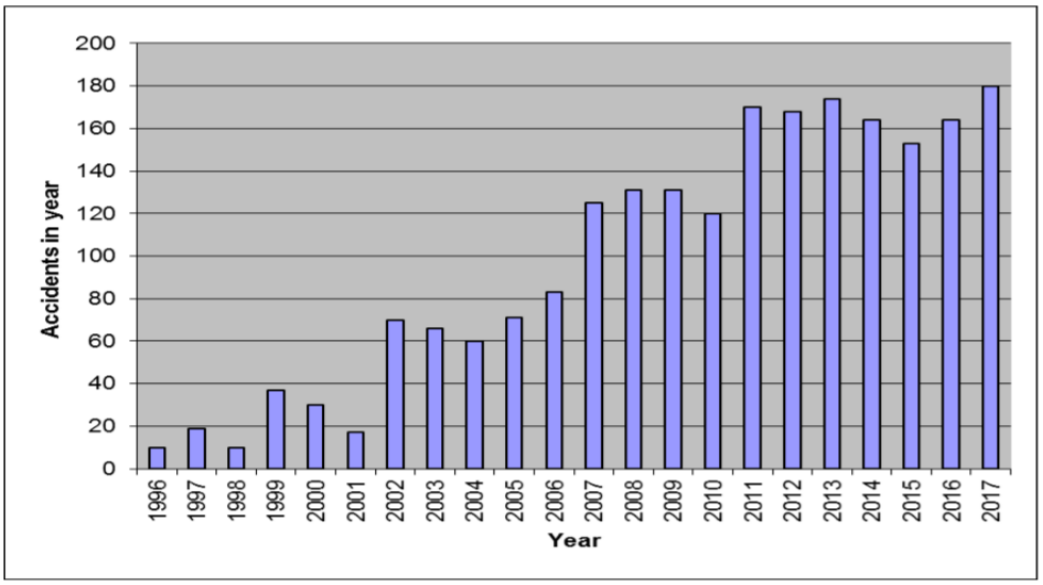


Figure 2:3: Global wind accident data from 1996 to 2017.
Source: CWIF (2018). www.caithnesswindfarms.co.uk

According to Caithness Windfarm Information Forum (CWIF), (2018), the increasing trend of these accidents will be the case for as long as there is an increase in the number of windfarms being constructed globally. According to their report, the accident data they receive is just but a tip of the iceberg as many wind construction farms do not disclose their accident data. The wind companies "guarantee confidentiality" of incidents reported. No other industry have a comparative high level of secrecy. EU-OSHA (2013) notes with concern the scarcity of available data on Safety and Health in wind industry. This is mainly attributed to the fact that, in comparison to other industries, the wind industry is relatively young with new previously untested technology being developed progressively.

A shortage of skilled labour was identified by EU-OSHA (2013) as one of the key challenges OHS faces in the wind industry. The rapid development of this sector further exacerbates this issue. Between 2007 and 2010, jobs in the wind industry in the EU rose by 30% while the EU rate of unemployment rose by 9.6% (EU-OSHA, 2013). A shortage of 5000 workers per year was noted in the EU specifically in the wind industry and this could likely reach annual shortage of 28,000 workers by the year 2030. This would mean that the industry employs a significant number of unskilled wind industry workers who would have inadequate knowledge in OHS in the wind industry.

Results of such research have driven countries such as Belgium and New Zealand, to develop regulations that protect the general public from the risks brought about by living near wind farms. This could mean that if there is adequate research on risk exposure on wind industry construction workers, the national governments will take it upon themselves

to protect these workers. Despite the relatively good pay, workers within the wind industry, only stay for between 3-4 years (European Agency for Safety and Health at Work, 2013). The reason could be related to Safety and Health risks they are exposed to. Given the myriad of hazardous activities related to wind power development, this could be a key contributor to the risk exposure.

To a large extent, customizing the OHS strategies to suit the requirements in Kenya, the OHS management team for Vestas Eastern Africa Ltd applied the various OHS laws in Kenya to ensure compliance to the Kenyan legislation as well. The laws considered include the Occupational Safety and Health Act, 2007; The Factories Act, 1958; Safety and Health Committee rules, 2004; Medical examination rules, 2005; First Aid Rules, 1977; National Transport Safety Authority Act, 2014; Building Operations & Works of Engineering Construction Rules 1984; Noise Prevention and Control Rules, 2005; and the Work Injury Benefits Act, 2010. Other Acts, such as the Energy Act, Electrical Rules, Civil Aviation Authority Act among others were also applied due to their relevance in the wind industry. It tis however important to note that a big gap exists in the local legislation as regards Wind Energy. The team had to therefore piece together different sections of different local legislation and also include international guidelines such as those outlined in the Global Wind Organization.

2.5 Theoretical Framework

Three major theories guided this study: Complexity Theory of Management; Theory Z.

2.5.1 Complexity Theory of Management

First are the systems theory and the complexity Theory of management. The systems theory of management focuses on the different parts of an entity and how these parts interrelate to each other for the overall functioning of the entity. This theory was birthed by Ludwig von Bertalanffy, in his book “General System’s theory” (1940). As a biologist, he viewed the human body as a system of interdependent connections of the different parts in order to support an optimal functioning of the body. Von Bertalanffy stated that real systems open to, and interact with, their surroundings. They acquire qualitatively and progressively new aspects through emergence, which results in evolution. Instead of disintegrating a system into its constituent parts, systems theory assesses the on the links between the parts which connect the parts into a whole (Heylighen, 2000). An organization can equally be likened to an open system. Just like the human body, an organization is

composed of different distinct elements that interrelate and interact with each other in order to ensure the achievement of the specific organizational goals. Without a cohesive relationship, for instance between management and the employees, and the personnel and the organizational equipment, and equally between the organization staff and the society (environment), the organization may not be able to achieve its goals.

Increased attempts can be seen through mid-20th century to apply theories of the changes in organizations to the analysis of organizations of humans. This concept notes that organizations constantly interact with their surroundings. An organization is composed of links between stakeholders and external factors which may or may not be in their control. According to Amagoh (2008), however, the increasing changes and complexity of organizations exposes the inadequacy of the systems theory. Complexity theory was then developed to cater for these complexities and changes. Complexity theory recognizes that systems usually evolve into different new organizations. For these reasons both systems theory and complexity theory were considered.

2.5.2 Theory Z

Secondly, Theory Z as developed by William Ouchi, also known as Japanese management, suggests that involved workers are the key to increased productivity. Two basic lessons drawn from this theory are; trust between management and workers, and awareness of subtlety by management. To further expound on this, Theory Z bases its argument on an attitude of mutual trust, where managers trust workers to make important decisions and to get involved in company policy making since the mangers realize that the workers actually want to be involved in making decisions that will be for the benefit of the company, and workers trust managers to reward them for their cooperation and support. In the case of the implementation of the OSHMS, feedback mechanism between the employees and the employers connotes mutual trust and positive attitude which inherently improves the level of employee awareness on the different phases of the implementation of the OSHMS.

While the systems and complexity theories support the management system in itself, theory Z supports the interaction between the different levels of employees and the employers for the successful implementation of the management system. A complex link between the employees' capacity and the environment, individual attributes, the management, and the organizational structure as a whole is supported by the complexity theory. These elements in the organization do not exist separately but as a whole. Impact

on one of these elements directly or indirectly impacts on another element as seen in fig 2.4. For there to be an effective relationship between these individual elements, mutual trust is paramount especially between the management and the employees. As a result, ideally, the OSHMS implementation will be flawless. This research will seek to identify any gaps that can be a hindrance to effective implementation of this system and ways in which they can be addressed.

2.6 Conceptual Framework

The successful implementation of a working occupational safety and health management system has a heavy bearing on the level of employee awareness on the system. The complexity of the system makes it even more crucial to ensure employee participation from the planning stage to the review stage.

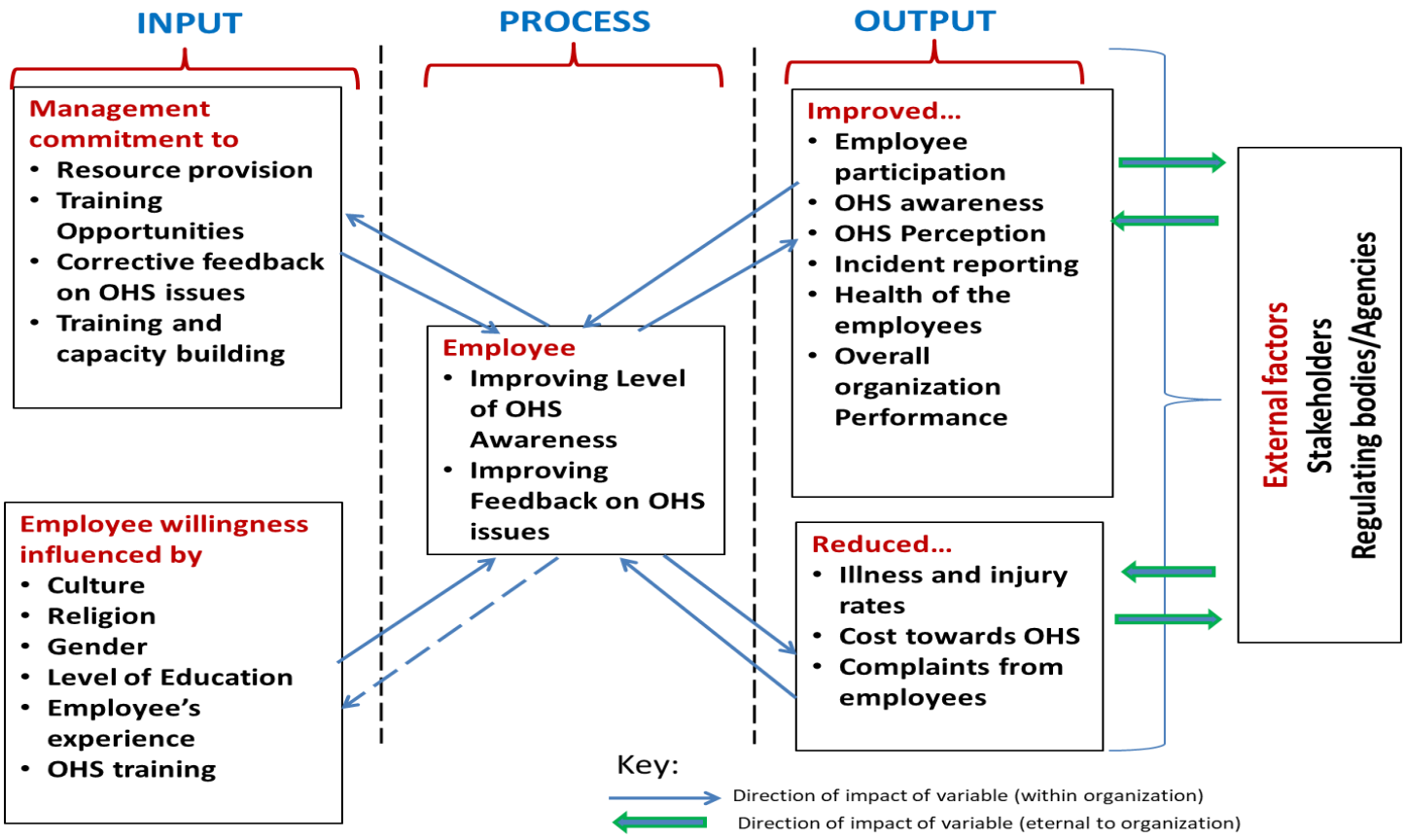


Figure 2:4 A conceptual framework to analyze employee capacity in the implementation of the OSHMS.
Source: Adopted from Redinger et al, 1998

As depicted in figure 2:4, employee level of awareness is dependent on commitment from management to provide resources (such as safe equipment, personal protection equipment, finances), training opportunities and also give feedback to employees on OHS issues that were raised. Flow of information to the employee and back from the employee to management is a pre-requisite of successful implementation of the OSHMS. It cannot be stressed enough that management needs to show commit to the management systems, a commitment without which the employees devalue the OSHMS and thus decrease their intentional participation.

However, this should be considered together with the employee willingness to be part of the OSHMS. The team that implements the OSHMS ought to consider the employee cultural background, religion, gender and the training and capacity building of the employee. The sum total of the employer commitment and the employee willingness is the basis to the success of the implementation of the OSHMS. This is as summarized in the following formulae:

Employer/ Management Commitment	+	Employee commitment / willingness	=	Improved level of Employee capacity on the OHSMS

In as much as documentation is a key part of the process in implementing the OSHMS, ensuring employee participation in the processes of designing the documents, and feedback on use of these documents is key. Each step of the implementation of the OSHMS requires employee participation which will play a role in improving the employee level of awareness. On commitment, research points out the effectiveness of worker participation will be reduced if the employees do not desire to participate, they do not see the program to have their interest and are not committed to the organization nor its goals.

The main goal of the OSHMS is to reduce the injury rates and as such Vestas Eastern Africa set an ambitious goal or Zero Lost Time Injury Incidents within the course of implementing the project. With this come benefits such as improved employee perception of the OSHMS and also their level of awareness on the process of implementation or operation which in turn reduces the costs related to injuries at site. Notwithstanding external factors such as legal agencies and other stakeholders influence the progress and success of the implementation of the OSHMS

CHAPTER 3 AREA OF STUDY AND METHODOLOGY

This chapter discusses the research methods that were employed for this study in a bid to respond to the objectives of the research. Qualitative research methodology was employed which is ideal for small samples. It shall further outline the design of research that was employed, the data collection methodology and instruments that were used, validation and administration of these instruments, responses from the field study, and statistical analysis of the gathered data. The main advantage of qualitative research is that it provides a complete analysis and description of the topic under research, but does not limit the research scope and the responses of participants' (Yin , 2009).

3.1 Study Area

3.1.1 Geography

On the southeastern flanks of Lake Turkana (the largest permanent desert lake in the world), Loiyangalani sub-county in Kenya's Marsabit County is home to the Lake Turkana Wind Power Project, which will generate 310MW once completed (LTWP ESIA, 2008].

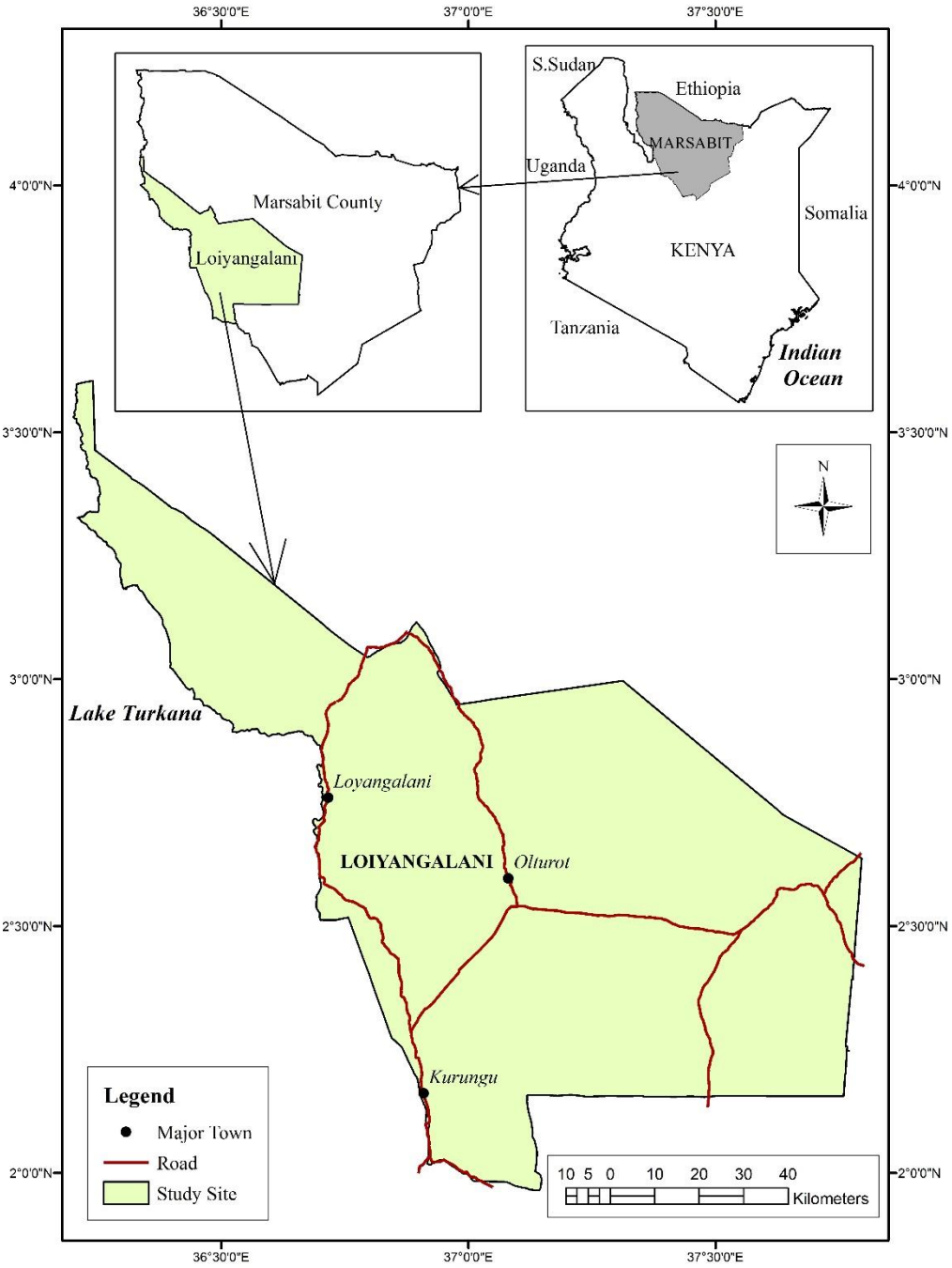


Figure 3:1: Study area: Loiyangalani sub-county, Marsabit County
Source: Researcher

Loiyangalani is sparsely populated area dominated by pastoralist and fishing communities of El Molo and Turkana tribes. Sarima, the exact name of the village where LTWP is located is a hinterland, with makeshift settlements. Winds in this locality are generally high with an average speed of 12m/s making this area ideal for the construction of the wind farm.

The area is relatively flat with Nyiro hills and Mt. Kulal as inselbergs. Numerous ephemeral rivers in the area of low rainfall (between 200mm and 1000mm annually) drain into Lake Turkana (LTWP ESIA, 2007). The land surface is characteristically rocky with many sections covered by bear rocks. Sandy soils cover the less rocky areas allowing for the scanty vegetation growth.

According to the 2009 population census, Marsabit County, had a population of 291,166 of which 5,117 were recorded from Loiyangalani sub-county urban centers. The population growth rate within the urban centers is seen to significantly increase with a population of only 1000 persons recorded during the 1999 national census.

3.1.2 Vestas Eastern Africa Limited: Population under study

Vestas Eastern Africa was established and incorporated in Kenya in the year 2014. Its core business is to develop the Vestas Global business through the identification and acquisition of new markets within Eastern Africa for the wind turbines, designed, manufactured and installed by Vestas Global. The OSHMS that exists within Vestas Eastern Africa was developed and ceretified through Vestas Global, whose head offices are stationed in The Netherlands.

Vestas Eastern Africa Ltd was given the mandate by the Lake Turkana Wind Power Company to acquire the wind turbines for the LTWP wind farm, and installation of the same. A separate contract was then drawn that mandated the company to service the wind turbines for fiften consecutive years after the completion of the construction face. Specific tasks assigned to the company included receiving the turbines and turbine components at the Mombasa Port, transportation of the turbines and turbine componenets from Mombasa Port to Sarima, Loiyangalani subcounty, Marsabit county and installation of the turbines in accordance to the the LTWP wind farm design. In as much as the client (LTWP) held the overall Safety and Health Responibility for the wind farm, Vetas Eastern Africa was directly reposnible for the Safety and Health of its employees and its sub-contractors (EGMF, Bollore Africa Logistics, Anipsotiki S.A).

Under the guide of the Vestas Global OSHMS manual, Vestas Eastern Africa Ltd adopted the OSHMS strategies and implemented them in the LTWP project. It is important to note that

globally, Vestas implements its OHS management strategies based on the Vestas Global OSHMS manual. Additionally, due to the legislative, geographic, demographic, social, economic differences especially within the project area in comparison with the more developed Vestas Global location, the Safety and Health team for Vestas Eastern Africa was charged in developing a more localized Safety and Health Management Plan. The OSHMS considered the availability of specialized personnel for the tasks, training needs, cultural differences including language barrier, differences in level of education, environmental challenges among others. The Site Manger was charged with the overall Safety and Health Responsibility seconded by the Deputy Site manager. A Health Safety and Environment Manager was given an advisory role for not just the Vestas Management but also the subcontractor management through the Vestas Health Safety and Environment Officers. This is illustrated in figure 3:2. Supervision of the subcontractors was done through daily site inspections, area specific audits, weekly meetings, and weekly or monthly document review depending on the risks identified.

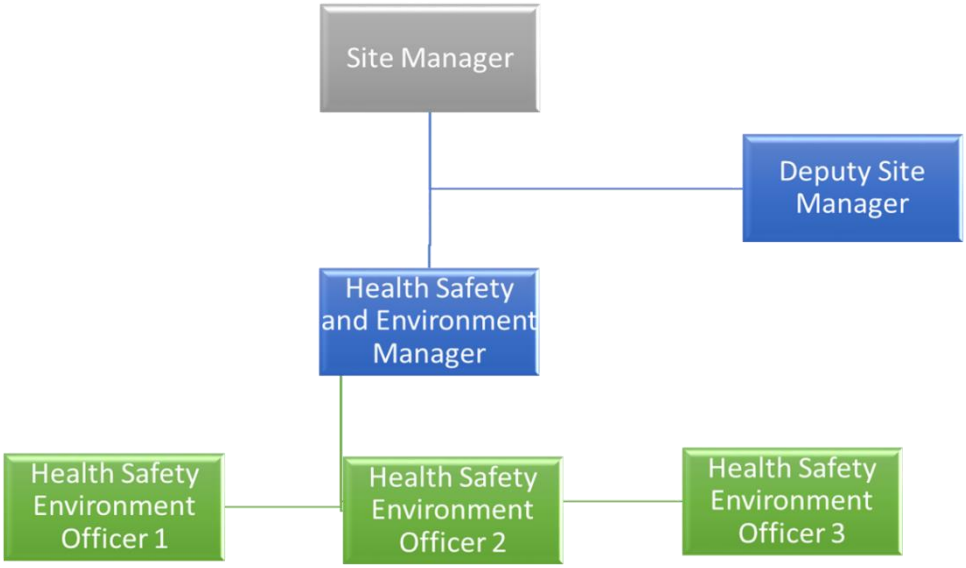


Figure 3:2: Vestas Safety and Health Management team.
Source: Field research

Through this team, Vestas Eastern Africa worked to achieve their company Safety and Health objectives: Ensuring no lost time injury occurred during the construction period (January 2015- June 2017) and Achieving 100% compliance to safety and health requirements (Kenyan, international, and company requirements).

3.2 Research design

Case study research design was employed for the purposes of undertaking this research and specifically a single-case study design. Yin (2009) describes a case study as an empirical inquiry about a contemporary phenomenon set within its real world context. This is especially when the boundaries between phenomenon and context are not clearly evident. In essence, it goes beyond the study of isolated variables. In addition, case study research design is applicable as the researcher controlled the events governed or being governed by the OSHMS effectiveness. The case under study is not considered to operate in isolation, but rather a system in which different variables impact on each other. In this case, effective implementation of OSHMS is thought to be influenced by the cultural background (religion, race, and tribe) of the workers, their level of experience and education, task specific and Safety and Health training among other variables as depicted in the conceptual framework. To further understand the effectiveness of the occupational Safety and Health system, it is also necessary to understand the viewpoint of the different levels of management.

According to Zainal (2007), the drawback of the single case research design, is its inability to provide a generalizing conclusion. Additionally, case study research may lack rigour due to biased views from respondents. The lack of generalization of an individual employee's capacity in regards to OSHMS implementation, was seen to contribute to the development of a richer insight in the relationship between the individual's capacity at work and their involvement in the implementation of OSHMS. Vestas can draw lessons from this research and translate them to other projects that they manage globally. To manage respondent bias due to possible influence from the researcher, the researcher worked with the project prior to commencing the research which gives an in-depth understanding of the systems of work, employee relations and management influence. Additionally, selected data collectors that were considered not to be biased were identified by the researcher from the target population in order to assist in data collection, and avoid influence of fear of intimidation, and increase anonymity both of which reduces chances of respondent bias.

The merits of case study research design are various. They include, the fact that they explore data in real life situations with no manipulation of data, they allow the researcher to analyze

the data both quantitatively and qualitatively, and they allow detailed data collection in comparison to other research designs.

3.3 Population and sample

Lake Turkana Wind Power Project and employees of Vestas EA Ltd were the focus of the study. Approximately 30% of the workers employed under the Lake Turkana Wind Power Project come from this local population, which constituted about 400 workers.

3.3.1 Sample size and sampling procedure

At the time of the study, the 380 workers that were employed under the Vestas Eastern Africa Contract in the Lake Turkana Wind Power Project constituted the study population. The 380 workers included those directly employed under Vestas Eastern Africa and also those employed by her sub-contractors (Anipsotiki, Bollore Africa Logistics and Enterprise General Malta Forest).

A sample size of 195 employees was determined using a Slovin's formula from Yamane (1967).

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

Where:

n: sample size

N: proportion of the population

e: degree of precision = 0.05

$$\boldsymbol{n = \frac{380}{1 + 380(0.05)^2}}$$

$$\boldsymbol{n = 195}$$

Using random sampling, the respondents were selected from each company to represent the population under study. The number of respondents from each company was as in table 3:1:

Company	Actual No. of employees	Proportion of Sample size (No.)
Vestas Eastern Africa Ltd	62	33
Enterprise Generale Malta Forest-Kenya	203	96
Anipsotiki	97	58
Bollore	18	8
Total Number of employees	**380**	**195**

Table 3:1 Sample respondents selected from each company.
Source: Field data

For the collection of survey data, self-administered questionnaires were distributed to 195 employees to represent the entire employee population, and eighteen (18) administered online to all members of the management team (management questionnaires). See *Appendix II* and *Appendix III* for samples of these. Given that the management team were small in number, the researcher opted to collected data from all of them. However, only twelve (12) responded to the questionnaires.

Eight (8) members of the management team from the various companies and three (3) supervisors were interviewed as the key informants in order to seek an understanding of the challenges and opportunities faced by or identified for the successful implementation of the OSHMS. Some members of the management team were apprehensive in giving information about their companies' OSHMS siting that they are to seek approval from the higher levels of management. Some were unresponsive after the questionnaires were issued to them.

Six (6) focus group discussions were conducted with the subcontracting companies and one with the main contractor Vestas East African Limited. The number of discussions and the participants for each FGD, were settled on after discussion with the respective companies' management teams. The decisions were based mainly on the availability of the employees to engage in the focus group discussions. However, it was equally noted, during the FGDs, that the management teams selected employees who were more conversant in their companies' OSHMS in order to paint the respective companies in good light in regards to their management of Safety and Health. Table 3:2 shows the FGDs participants from each company.

Name of Company	FGD Ref:	Senior Management	Middle Management	Front Line employees		Total participants
				Contracted Employees	Casual employees	
Vestas Eastern Africa	001	0	3	8	0	**11**
Bollore Africa Logistics	002	0	1	6	0	**7**
Enterprise Generale Malta Forest	003	0	2	4	4	**10**
	004	0	2	4	4	**10**
Anipsotiki	005	0	1	3	4	**8**
	006	0	1	2	2	**5**

Table 3:2: FGD participants from each company
Source: Field Data

3.4 Data Collection methods

3.4.1 Documents Review

An in-depth analysis of the OSHMS was done in collaboration with the Vestas Health, Safety and Environment team and the site management. The aim was to gain more understanding of the OSHMS that has been implemented and especially the role the employee plays in its implementation, operation and review. The purpose of the OSHMS was checked against the success of the implementation and whether implementation gaps were identified and managed. The researcher outlined the aspects of the OSHMS that require employee input and the aspects that directly or indirectly affect the employees. The employees were in this case divided into four: Management level, middle management level, skilled laborers and unskilled laborers. Not only did this enable the researcher to acquire representative information from all the levels of management, but the researcher also identified which aspects of the OSHMS are affected by or affect the various types of employees. Each of the four Vestas' sub-contractor companies were subjected to similar differentiation of the employees.

Secondary data was sourced from similar research that has been carried out in similar or different environments, in various or similar sectors. Such comparison was necessary to give the researcher better understanding of the various elements in the implementation of OSHMS; identify other challenges faced by other researchers and how they addressed such challenges. Secondary data additionally guided the researcher to predict the result that should be expected given the similarity in the researches. Documents from international bodies such as the WHO,

the ILO and the EU-OSH were instrumental in providing OHS data globally from research that have been carried out by these bodies.

Literature of document review are known to be a good source of background information and are relatively inexpensive. A critical advantage is that document review may shed light on issues that may not have otherwise been considered by the researcher. Information acquired through this method may, however, be inapplicable, disorganized, unavailable or outdated. The researcher's data mining method may result in biasness due to the selective subjective research thought process. Information may be incomplete or inaccurate and the method is known to be time consuming to collect, review and analyze documents. Comparison between data collected earlier and more recent data will to a large extent manage the fact that some data is outdated. Additionally, the researcher will as much as possible collect data from documents published from between the years 1980-2018. Data sourced from earlier publication will mainly be used to guide the researcher on the development OSHMS in different parts of the world.

3.4.2 Employee Survey Questionnaires

The questionnaires were used in collecting information on the participant's social characteristics, their present and past behaviors. Data concerning their beliefs and reasons for acting in particular ways in respect to health and safety management, and their general behaviors and attitudes were also collected (Bird, 2009). For the purposes of this report, semi-structured questionnaires with Likert-scale, ordinal scale and interval scale questions and closed ended questions were applied in the development of both questionnaires. The Cronbarch's alpha test was used to test the reliability of the questionnaires, while test-retest and pilot studies were used to test the readability and the face validity of the questionnaires.

Some questionnaires were electronically sent to the respondents (management team respondents), while others were self-administered. Of those submitted online (18), only 12 questionnaires were filled and valid for the purposes of this research. This puts the response rate at 67% which is higher than what is indicated by Nulty (2008) putting the response rate for online questionnaires to be as low as 20% and as high as 47%.

Of the hand delivered questionnaires, respondents with low literacy levels required the assistance of other more literate colleagues to explain the questions, interpret them and translate their responses onto the questionnaires. Two data collectors in this case were identified who assisted in the collection of data from these employees. Respondents from other countries who did not understand the English language employed in the questionnaire also had an interpreter, in most cases their colleague of choice translate the questions for them and translate their responses onto the questionnaires. 195 questionnaires were administered to the population, while 18 questionnaires were sent online to the management team.

The use of questionnaires had some merits and demerits which guided the researcher in the use of this method to collect data. Questionnaires are comparatively inexpensive and easy to use even when the data is sourced from large populations. The anonymity attached to self-administered questionnaires gives more comfort to the respondents owing to privacy of the information they share. Additionally, responding to, and analysis of close ended questionnaires is comparatively easier and saves time. Unfortunately, response rate of self-administered questionnaires is not high and different respondents respond the questions as per their different understanding of the questions (Yamane, 1967). The response according to various researchers (Ballantyne, 2005; Cook, 2000;) for paper-based questionnaires are between 55% and 57%. Some researchers however found a lower response rate of 32% (Watt *et al*., 2002) while other such as Dommeyer (2004), noted the response rate to be 75%. All in all, the response rate has not been noted in any literature to be 100%. In order to increase the probability of having a high response rate, the researcher designed questionnaires that are not too long in order not to waste the respondents time, majority of the questions were closed ended with multiple choice questions which are easier to respond to. Additionally, a pilot study was conducted using these questionnaires and responses guided the researcher on how to improve the questionnaires to fit the audience. The use of data collectors, that were familiar to the respondents also helped in improving the response rate as the data collectors assured the respondents that the research was only meant for the purposes of research.

3.4.3 Focus Group Discussion

The choice of using Focus Group Discussion (FGD) technique was due to its flexibility and richness in collection of data usually not achieved when applying data collection instruments

individually. Just like the use of the questionnaires, FGDs are considered easier to drive and conduct and allows the researcher to explore topics and to generate hypotheses. They have high face validity and gives an opportunity for the researcher to collect data from the group interaction which concentrates on the topic of the researcher's interest. Additionally, the researcher gets speedy results in terms of gathering evidence from the group interactions. Unfortunately, the researcher has less control over the data that are generated, and the analysis of data is more difficult to be done. Additionally the interviewers are to be carefully trained to administer the questions and to gather the relevant data. Assembly of these groups equally take effort, especially in a dynamic atmosphere like the construction industry.

The perception, opinion, and beliefs of the respondents towards the OSHMS was tested in order to test the companies' safety culture. 10 participants from each company were selected from the employees and the management team and were requested to participate in the exercise. As seen on table 3:2 , not all who were selected to participate in the FGDs were present to participate for the discussions. Consideration was put in selection of the participants to include their years of experience, area of origin and literacy level. Each company was given the liberty to select its participants for the exercise. One consultative meeting was held with each of these groups on separate days and locations. The information received was noted down on paper by the moderator. This later guided the development of the report.

Focus Group Discussions as a method for collecting data was selected by the researcher since it gives more detailed information through stories and interaction than the questionnaires, interviews or observation methods. Unfortunately, the dynamics of the group may inhibit an individual from being honest or open about specific issues for fear of intimidation, the participants may also take the opportunity to air their grievances instead of responding to questions asked on the research topics (Morgan, 1996). To manage these challenges, the researcher, who was the moderator at each of the FGDs, developed a guideline for conducting the FDGs. A time keeper was selected from each group to prevent a responder from taking too much time which aids in keeping within the confines of the discussion. Additionally, each of the participants were called upon and given equal opportunity to respond to the different areas raised during the FDGs. It was seen that, as the discussions progressed, the participants

became more at ease in responding to the questions and more willing to respond to the questions, and in turn raise questions themselves.

3.4.4 Observation

The researcher at length used participant observation as a key tool to collect data. To capture this data, photographs were used. Observation was used to collect data as the employees carry on their tasks including, management intervention, Safety and Health controls as spelled out in the OSHMS and the translation of these controls onto the ground as employees carry on their tasks. Since this exercise was done after the key informant interviews and the literature review, the researcher was in a good position to confirm or identify gaps between what had been read, what the management expects as per the guidelines, and what was actually on the ground.

Additionally, the researcher first conducted non-participatory observation in order to gain better understanding of how the population conducts itself on a day-today basis. This also helped the researcher to plan for the exercise based on the different shifts, off-days, and work plans of each group. This was especially crucial for observing and analyzing Bollore Africa Logistics team who were not based at the project area, but would bring in the turbine and turbine parts based on their schedules.

Data was then recorded by the use of photographs, notes, and observation checklists. The researcher grouped the target population first into companies, then into sub-groups of the tasks being carried out as illustrated in table 3.3.

Company	Ref.	Name
Vestas	OBS-001	Management team
	OBS-002	Green team
	OBS-003	Construction supervision team
	OBS-004	Service technicians
EGMF	OBS-005	Management team
	OBS-006	Support team
	OBS-007	Construction supervision team
	OBS-008	Excavation/Backfill team
	OBS-009	Steel fitters
	OBS-010	Concrete task team
Bollore	OBS-011	Management team
	OBS-012	Drivers
Anipsotiki	OBS-013	Management team
	OBS-014	Drivers
	OBS-015	Heavy machinery operators
	OBS-016	Turbine preparation team
	OBS-017	Turbine installation team

Table 3:3 OHS Site Observation plan

An observation schedule was developed and observation checklist based on the objectives of the study also prepared prior to the start of the exercise. 51 participative observations and 20 non-participative observations were conducted between the months of September and December 2016. Three (3) observations were conducted at different times on different days for each target team. Each team, apart from the management teams, was always composed of different participants even though these teams may be performing similar tasks. This was so that the researcher can see whether there was consistency in the management of Safety and Health among the teams or there were factors that influenced individual or groups behaviour in regards to Safety and Health management. The observations were conducted at different times of the day, and the times for these observations were noted in the observation schedule (See *Appendix IV* for sample observation schedule).

The advantages of using the observation method are that the researcher collects data in real time, and does not rely on respondents' willingness to provide information. It gives wider platform for researcher to interact with the various targeted groups. Unlike the Focus Group Discussion, observation is not controlled by the observer. The target group behaves or reacts in its most natural state. However, this tool is susceptible to observer bias and the Hawthorne effect where people perform better when they know they are being observed (Evaluation, 2008). To manage observer bias, the researcher developed a plan to guide the exercise, with guidelines on what to look out for based on literature already analyzed. An observation schedule also enabled the researcher to cover the various areas of the workplace in an orderly, methodical manner. The researcher, being originally engaged in the project as part of the project helped in managing the reactions of the target groups which viewed the participant as part of them and not an outsider in-front of whom they may need to alter their behavior.

3.4.5 Key Informant Interviews

The purpose of employing the key informant interview method is to derive qualitative data from members of the community that are more informed about the happenings in the community. Face to face was employed in conducting the key informant interviews as opposed to telephone interviews. A more informal approach was adopted with the interviewer being guided by the key issues that clarification or more information was stated. In some cases, the same persons had been earlier issued with the management questionnaires due to the positions they held within their various companies. To reduce ambiguity in repeating the questions, an informal approach was selected since it allows the interviewees to respond outside the box, be more open to the researcher, and it saves time for the interviewee. An interview guide was however used to guide the researcher not to forget any important issues that the researcher had planned to raise. This guide also guides the time the interview takes, and ensures the interview remains within the areas of interest.

The Key Informants selected by the researcher were members of the management teams from each company, Safety and Health team from the client, and some employees who were identified to be among the first employees to reach the project area prior to the start of the project. In total, sixteen (16) key informant interviews were scheduled for, although the researcher was unable to reach five (5) of the target persons. The main criteria the researcher

employed to select the informants is the roles that these informants played within the community. The researcher additionally formally communicated to the potential interviewees to briefly state the intention of the research, the interview and request an audience with the interviewees (See introductory letter, *Appendix V*).

The quality of data that can be achieved within a relatively short time is one of the advantages of the Key Informant Interviews. A demerit however, is that the key informants may not necessarily know the view of the majority. Their opinion is likely to be subjective based mainly on their own experience. Marshall (1996), also identifies the fact that the interviewee may be of a significantly higher status that may intimidate the interviewer. Since the interviewer was engaged actively in the project at the time of the research, the researcher had initially interacted with the interviewees, thus increasing familiarity and ease of interaction during the interview. Another disadvantage is that the key informants may give responses that are 'politically correct' based on their standing in the society and may not divulge some information for fear of painting their organizations in bad light. Some information, was that given to the researcher may not, in this case be included in the research document, but the information informed the research without necessarily identifying the source of the information.

3.5 Data Analysis and Presentation

3.5.1 Analyzing Employee survey data

The researcher looked at the filled in questionnaires to check for gaps (unanswered questions, double entry of data for the same questions). Only the valid questionnaires, which were seen to be complete were used for the purpose of this research. The questions within the questionnaire were then numbered and the possible responses coded. Coding is basically, putting the responses into nominal-level categories. Some questions required binary responses (Yes/No), some required nominal responses. Some responses were in categories such as the 'number of years of experience' which had to be coded for instance:

Number of years	Code

Number of years	Code
<1 year	1
1-5 years	2
6-10 years	3
11-15 years	4

Table 3:4 Employee survey coding sample

The questions requiring binary responses were coded as well, with for instance 'Yes' being represented by '1' and 'No' being represented by '2'. Coding was done to ensure ease in using the data analysis tool of choice (Epidata for data entry and SPSS Version 23 for data analysis).

One the coding was complete and only the valid questionnaires identified and numbered, the researcher entered the data into Epidata which she found easier to work with during the entry of data and eventually translated the data onto SPSS which was chosen due to its ease in use for manipulating the data to gain specific information. SPSS also develops well-structured graphs and charts which the researcher found are easy to read. Chi-square test of independence was used by the researcher to determine whether there is a significant relationship between any two categorical variables initially identified by the researcher.

3.5.2 Analyzing Focus Group Discussion Data

Data collected through focus group discussions were recorded through note-taking by the team leader (the researcher in this case). The data recorded were read and scrutinized severally by the researcher for any gaps during note-taking. Identified gaps were filled from memory. Key words and issues raised by the members of the groups were listed down and comparisons made between one group and another. Reading of the notes, also identified similarities and differences in the responses given. The researcher then grouped similar thoughts from respondents and coded them using guide words. A sample is as shown in table 3:5:

Finding	No. of participants
Gaps in Health and Safety Management	
Inadequate training	26
Inadeqaute Supervision	12
Unsafe Equipment	20
Recommendation for improvement	
Inreased leave days	8
More training opportunities	31
Improve trust between management and employees	13

Table 3:5 Focus group discussion sample findings
Source: Field data

Mechanical coding of the responses helped the researcher to group responses from the different participants using collective terms such as 'inadequate training', and gain understanding of the general feel of the group in regards to the issues raised. Similarities and differences were seen in the respondents' responses, both within and between the groups. The role played by the cultures of the various companies were also identified through this analysis. The sentiments of the groups were presented in tables and graphs as shown in the results and discussion section.

3.5.3 Analyzing Key Informant Interview data

Given the similarities in the methodology for both the focus group discussion and the key informant interview, a similar approach was taken by the researcher in conducting the analysis. First the data collected from the key informants were read and re-read for similarities and differences. Each question represented a topic, and the various responses were grouped into similar ideas, terms, or ideologies and presented in a table with the number of participants having these similarities quantified. Significant differences were also noted and presented in the results and discussion section.

3.5.4 Analyzing Observation data

Physical actions, conversations, work patterns, expressive behavior were all subject to observation for the purposes of this research. The data from the photographs, notes, and observation checklists were then scrutinized for ambiguity and relevance. The researcher noted the similarities between the different groups in terms of their Safety and Health management strategies. It is important to note, that in as much as Vestas Eastern Africa Limited was the main contractor, each sub-contractor developed and adhered to its own management strategies guided by the Vestas OSHMS.

The researcher opted for a mechanical mode of coding the data as it was more conversant to the researcher. It would therefore save on time and ensure more representative data. First, the data collected were read and re-read in order to identify similar patterns, terms, behaviors and attitudes from the groups. These were then grouped and then put into subgroups depending on their similarity. The analysis revealed existing similarities and differences between

companies, sub-groups, and individuals' behaviors, attitudes, and ideologies associated with the different areas of the research objectives: individual cultures, company culture, education, gender, competence, and capacity among other.

3.5.5 Data Presentation

Pie charts were one of the tools applied for presentation of the data. Both the simple pie charts and enhanced pie charts were used. Pie charts were ideal according to the researcher as they are easily read by the reader. They follow the principle that the angles of each of its sectors is proportional to the frequency of the class it represents (UN, 2009). However, for sectors that are relatively similar in size, it is difficult for the reader to identify the larger or smaller proportions without having to calculate based on these angles. The researcher therefore opted to have the representative percentages attached to the sectors to manage this factor. The use of different colours for the pie charts further made it easy for a reader to identify the different variables and linking these to the legends on the pie charts.

Simple tables were also ideally selected for the purposes of data presentation for some of the data. They detail the different variables and their numbers or frequencies or percentages. This makes it easy for the reader to compare the performance of the different variables based on the research objectives.

A multiple line graph was used to display and compare past and current trends of OHS performance within the company. Multiple line graphs are considered ideal for such kinds of comparisons between variables separated by time, gender or other distinctly different variables (Location, company, countries).

The researcher also employed the use of bar graphs as one of the data presentation tools. This is considered one of the most used method of data presentation (UN, 2009). Data is presented in form of bars. They are equally easy to read in that the reader only has to look at the height of the bars. The longer the bar, the higher the quantity of the variable under study. Both the simple bar charts and the multiple bar charts were employed in the study.

Histograms were applied in the graphical presentation of frequency distribution data. The areas of the histogram bars are proportional to the frequencies of the classes they represent. Histograms are normally applied in the presentation of continuous as opposed to discrete data.

Geographic information was presented on maps that allow the reader to clearly understand the area under study. With the help of geo-referencing expert, accurate data was used in the development of a representative map showing the location and spread of the project area relative to the rest of the country (Kenya).

3.6 Reliability and Validity of the Research Design

According to Golafshani, (2003), research design reliability is the extent to which results reproducible if the same methodology employed are used, while Brink, (1993) adds that reliability of research design is its repeatability, stability and consistency of the respondent's accounts and the researchers (investigator's) ability to collect information and accurately record it. On validity, Brink (1993) notes that that research design validity is its ability to acquire accurate and truthful findings.

Threats to reliability and validity in research can result in significant errors in research results. In as much as error is inherent in all investigations (Brink, 1993), the degree of error can vary. A higher degree of error can result in less accurate and less truthful results. It is therefore imperative that the various possible sources of error are identified by the researcher and ways of eliminating such errors addressed before the research design selected is implemented. Errors are a source of bias in research.

In order to remove bias in respondents responses, Brink (1993), suggests that the researcher clarifies the nature and intention of the study end explains to the respondents how the methodology that will be used in collecting data. In addition, the researcher should build trust-relationship with the respondents by staying within the study area for a long period of time. Working within the area of study, the researcher was able to consistently study the respondents through interaction, direct observation, oral interviews and group studies. Over time, the researcher obtained consistent and reliable date with lower degree of bias. The researcher kept accurate and detailed field-notes over the period or study, which ultimately is the period which the researcher was working within the area of study (approximately 2 years). Variation in reaction to the study topic, acceptability and adoptability of the respondents to the OSHMS was assessed within this period, further reducing the margin of error.

The research tool was issued to a pilot team of respondents from the various companies (Vestas and her subcontractors). The results were assessed and gaps identified from this study were considered in improving the data collection tool (structured questionnaire) before the tool is given to the target population. The researcher purposely identified employees from different cultures, different religious backgrounds, different levels of education, in order to reduce errors that may arise due to respondent bias. In addition, in order to safeguard against elite bias, the researcher planned well, and focused on contrasting cases (negative, extreme, and contrasting views).

A clear description of the methodology to be used for this research aims to increase the validity of this research design. The researcher in this context guides other researchers who intend to apply this research design in other areas of study to obtain data that are comparable to the data obtained in this research. The repeatability of the study methodology will in this case qualify its reliability.

Research assistants were identified from each company who assisted the researcher in collecting data from the respondents. The researcher is in one capacity or another supervised the respondents from the sub-contracting companies. In order to avoid bias triggered by the different levels of management, peer data collectors were identified to assist in this aspect. In addition, the questionnaires issued had an option of anonymity aiming at reducing response error that may be as a result of respondent fear of intimidation from the data collectors and the researcher.

CHAPTER 4 RESULTS AND DISCUSSION

This chapter seeks to answer the research objective to give the researcher and the reader an understanding of the link between improving employee capacity and the implementation of the Vestas' Occupational Safety and Health Management System effectively.

4.1 Characteristics of the sample

As was earlier stated, 195 employees to represent the entire employee population. Out of these, 74% (143/195) of the employees from these companies responded to the questionnaires. Mundy, (2002) states that as much as 60% response rate is acceptable, above 70% would be preferred. In this case the research response rate is considered acceptable.

Of the respondents, 91.6% were male while only 8.4% were female. This is not a strange occurrence in the male dominated construction industry which prefers to hire males more than the females. In the UK for instance, women constitute approximately 10% of all employees in the construction industry (Sang *et al*, 2012). The employees under study originated from different parts of the world: Kenya, Jordan, Greece and the Netherlands as represented in figure 4:1.

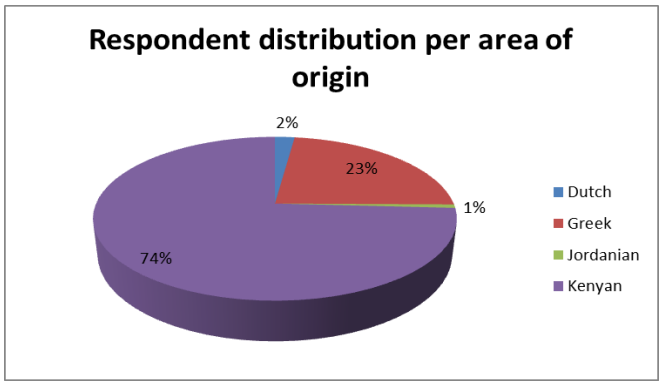


Figure 4:1: Respondent distribution per area of origin

Source: Field data

It was interesting to note that the youngest employed employees were between 18-22 years (14.7%) with the oldest being above 48 years old (10.5%). The majority of respondents were found to be aged between 28-32 years (24.5%) with the smaller percentage of employees being between 33-37 years (19.6%) as shown in figure 4:2. This result is similar to the survey result conducted in the Kenya construction industry where the most predominant age group of

construction workers is between 25-30 years at 48% followed by 30-35 years at 29%. Proportions of other age groups are: below 25 years at 7%, 35-40 years 9%, 40-45 years 3% and above 45 years 4% (NCA, 2012).

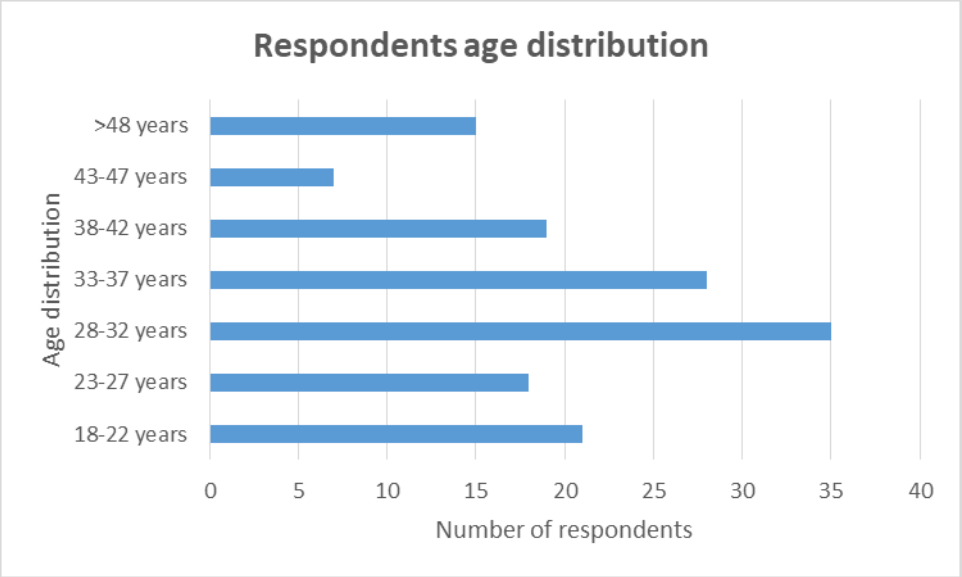


Figure 4:2: Respondents age distribution.
Source: Field data

The highest level of education within the company was at Masters level with 1.4% of the respondents having achieved this level of education. About 49.7% had achieved the secondary level of education while 31.5% advanced beyond the secondary level of education to achieve college level of education. At least 2.8% of employees had no formal education and were mainly tasked to work as cleaners and housekeeping within the projects. This is illustrated in figure 4:3.

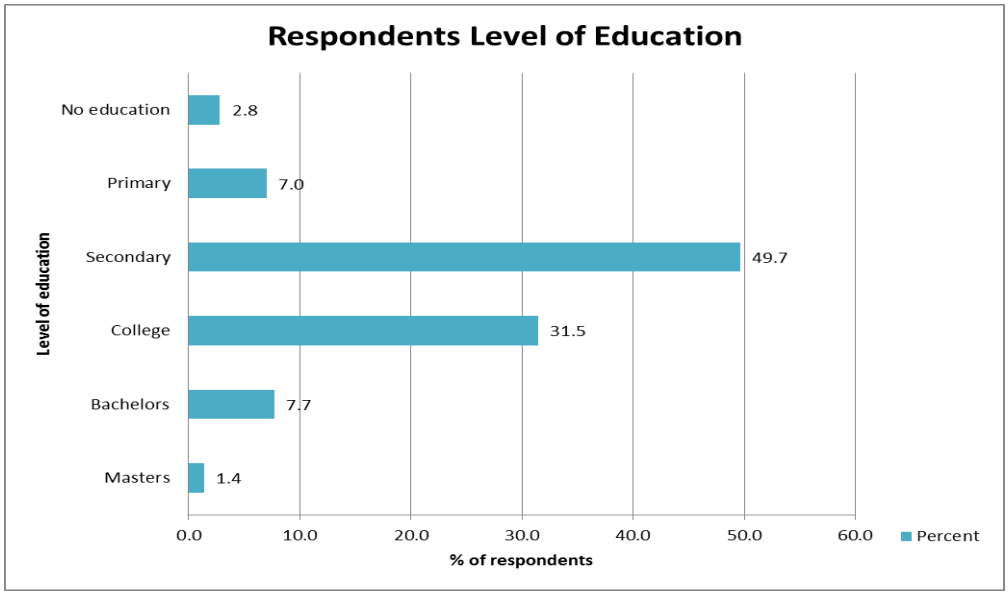


Figure 4:3: Employee level of education
Source: Field data

Given their ages, work experience and level of education, each employee was assigned different tasks towards the achievement of the project goals. From more professional tasks such as the management and supervision of tasks, specialized tasks such as masonry, steel fitters, turbine installation, there were also some tasks especially assigned to those with less than 1 year of relevant experience in any of the available tasks. These included the cleaners, housekeepers and tea makers. Table 4:1 clearly depicts this division.

Task	Frequency	Percentage (%)
Metal Worker	4	2.79%
Carpenter	6	4.20%
Cleaner	5	3.50%
Housekeeping	15	10.49%
Kitchen	3	2.10%
Installation	17	11.89%
Steel fitter	3	2.10%
Heavy machinery operator	20	13.99%
Driver	19	13.29%
Electrician	13	9.09%
Supervisor	10	6.99%
Manager	3	2.10%
Administrator	1	0.70%
Other	24	16.78%
Total	**143**	**100%**

Table 4:1 Respondents Task distribution in the LTWP

(Source: Field data)

A detailed review into the Vestas Risk Assessment documents showed an array of risks that these employees are exposed to. Employees with office based tasks such as the managers, officer cleaners and tea makers had fewer hazards that those working in the field. These hazards were mainly tripping hazards on items on the ground due to poor housekeeping, pinching hazards due to the seats they sat on or from closing office drawers or fatigue. The office areas were found to be well lit, with air conditioning and adequate working space significantly reducing risks on these employees. The employees were allowed to have frequent working breaks further helping them to relax and stretch their muscles.

Employees working mainly in the fields, which consisted of the majority of employees (95.1%) worked as electricians, masons, carpenters, steel fitters, machinery operators, as depicted in table 4:1. Given the significantly large number of hazards they are exposed to, the researcher identified the most significant hazards and outlined them in table 4:2.

No.	Task	Hazards	Persons at risk	Likelihood	Severity
1	Access clearance	Uneven grounds to access the wind turbine generators	drivers, supervisors, housekeeping	Likely	Low
		Fall from heights		Likely	Low
		Extreme temperatures (high temperatures)/Dehydration		highly likely	Moderate
2	Mobilization of cranes and HIAB	Collision with mobile equipment	Drivers, heavy machine operators, supervisors	Likely	High
		Crushing between equipment or equipment parts		Likely	High
		Impact from vehicles		Likely	High
3	Sorting the anchor cage ring segments	Pinches on hands by anchor rings	Steel fitters, supervisors (quality control team), metal workers	Likely	Moderate
		Knocks by the cranes, Hiab or vehicles		Likely	Moderate
		Extreme temperatures		highly likely	Moderate
		Musculoskeletal injuries		Likely	Moderate
4	Putting the levelling legs into the anchor ring segments	Awkward postures	Steel fitters, supervisors (quality control team), metal workers	Likely	Moderate
		Hits by falling anchor ring segments		Likely	Moderate
		Exhaustion		Likely	Low
5	Tightening of nuts of the upper levelling legs	Exhaustion	Steel fitters, supervisors (quality control team), electricians, installation team,	Likely	Low
		Pinches by spanners and nuts		Likely	Low
6	Loading of the assembled anchor cage onto flatbed truck	Slip and fall of the assembled anchor cage onto persons below	Heavy machinery operators and their assistants	Likely	High
7	Transportation of assembled anchor cage to turbine location	knocks by the flatbed	Drivers, community members	Unlikely	High
		Dust emission		highly likely	Low
8	Identification of	Heavy lifting	Housekeeping team,	highly likely	Moderate

No.	Task	Hazards	Persons at risk	Likelihood	Severity
	panels (sorting)	Dust emission	metal workers, supervisors, cleaners,	highly likely	Low
		Noise		highly likely	Low
		Extreme temperatures		highly likely	Moderate
		Biological hazard (animal bites and stings)		highly likely	Moderate
		Mechanical hazards		Likely	Moderate
		Hit by falling objects		Likely	Moderate
		MSD from manual handling which includes sprains and strains		Likely	Moderate
9	Joining panels	Electrical injuries	Electricians and their assistants	Likely	High
10	Bolting panels onto concrete plinths	MSD due to working in on position for long periods	Metal workers, steel fitters,	Likely	Moderate
		Dust		highly likely	Low
		Mechanical hazards		Likely	Moderate
		Hit by falling objects		Likely	Moderate
11	Compaction	MSD from working in awkward positions	Machinery operator, supervisor, civil works employees, community members,	Unlikely	Moderate
		Overexertion		Likely	High
		Dust		highly likely	Low
		Extreme temperatures		highly likely	Moderate
		Noise		highly likely	Low
		Fire		Unlikely	High
		Fuel spillage		Likely	Moderate
		Biological hazards		highly likely	Moderate
		Vibration		highly likely	Moderate
12	Performing internal blade repair	Creation of explosive atmosphere leading to an explosion	Steel fitters, service technicians, quality supervisors	Likely	High
13	Working with acetylene during heating of items	Creation of explosive atmosphere leading to an explosion leading to severe injury or fatality	Electricians, metal workers, steel fitters	Likely	High

No.	Task	Hazards	Persons at risk	Likelihood	Severity
14	Working on the nacelle roof prior to installation	Falling resulting in severe injuries	Service technicians, steel fitters, cleaners	Unlikely	High
15	Working on the nacelle after installation	Extreme weather (high winds and high temperatures)	Steel fitters, service technicians, quality supervisors, trainers	highly likely	Moderate
16		Falling from height (severe injury or death)		Likely	High
17	Working with HV/LV equipment	Electric shock from contact, arcing flashover, loose connections leading to severe injuries or death	Steel fitters (turbine installation crew), electricians	Unlikely	High
18	Connecting using pressure gauges	Injury if low due to pressure build up	Steel fitters (turbine installation crew), service technicians	Likely	Moderate

Table 4:2 Relating tasks to the hazards to the persons at risk of exposure

Source: Vestas, 2016

4.2 Influences of employee's capacity on Employee Participation in OSHMS Implementation

4.2.1 Influence of level of education on effective OSHMS Implementation

In this section, the level of education, for the purposes of the study, also includes any additional training that the employee acquired increasing their capacity to effectively and efficiently complete tasks assigned to them. As was earlier stated in Figure 4:3, 2.8% of the respondents were found to be without any formal education while the highest level of education was found to be the Masters level (1.4%). A majority of the employees were found to have achieved their secondary level education (49.7%) followed by college education (31.5%).

Of the 94.4% who said they had been trained on how to effectively undertake their task, about 67% had not received any formal training on the assigned tasks (*as illustrated in Figure 4:4*) and had gained their task performance experience through apprenticeship. Apprenticeship is more developed in the developed countries where an apprentice gain both theoretical and practical knowledge about a particular field, with emphasis on practical knowledge (Powell, 2018; Helmer, 2013; Vincent, 2004;;). In the developing countries, the quality of the apprenticeship, also known as the artisan training program, is normally dependent on the company engaging the apprentice. Damasah (2016) noted that the apprenticeship programs in Ghana seemed to lack consistency and adequate content in the training that apprentice receive. The researcher did not however find data that favors either the more informal apprenticeship programs or the formal educational and training programs.

Using the Chi-square test of association, the level of education was seen not to have any significant association with the individual's participation in the OSHMS implementation. Table 4:3 shows that the *p* value is 0.765 which is above 0.05 (95% level of significance).

Association between Employee level of education and involvement in OSHMS implementation		
	χ^2	***p* Value**
Level of education and involvement in an OSHMS implementation	1.941	0.765

Table 4:3 Chi-square Test of independence between education and involvement in OSHMS implementation

For the purposes of this study, it is however important to note that, of those that received informal or apprenticeship training, 73% received OHS training as part of the training to ensure that they performed the tasks in a healthy and safe way. At least 93% of those that received formal training, (degree, post-secondary, and diploma) had OHS training as part of their curriculum.

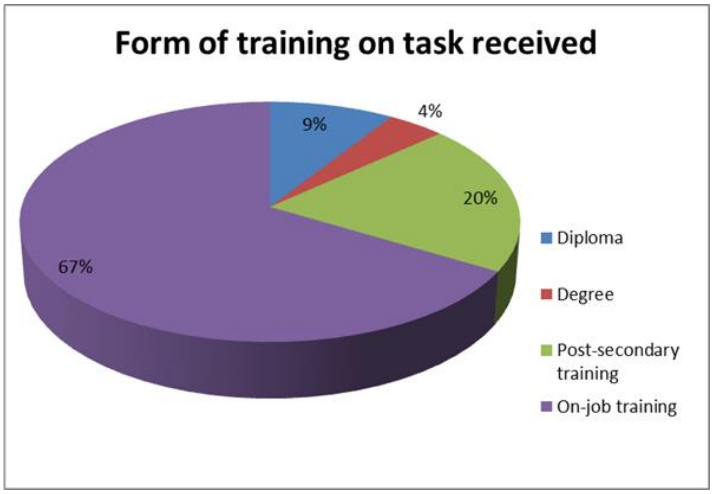


Figure 4:4: Employee form of employee training on the task assigned
Source: Field data

In addition to the formal or informal training received, those working within the project were trained in different capacities, not only in order to comply with the Kenyan (OSHA Act, 2007; First Aid Rules, 1977; BOWEC, 1984; Medical Examination rules, 2005; Safety and Health Committee rules, 2004) and International laws (IFC Occupational Safety and Health guidelines, ILO guidelines), and the Vestas OHS manual, but also to ensure increased level of OHS awareness and subsequently reduce the incidences of OHS injuries and illnesses. In these regard, 60.1% of the employees received additional training in various OHS capacities as in figure 4:5.

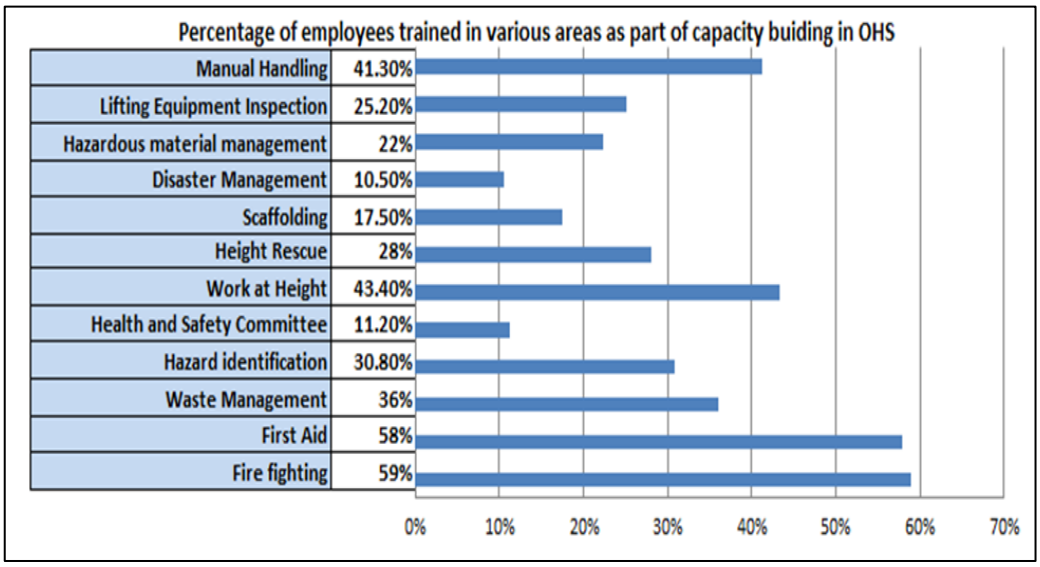


Figure 4:5: Percentage of employees trained in various areas of OHS as part of capacity building.
Source: Field data

The Global Wind Organization (GWO), emphasizes training in First Aid, Fire-fighting, Manual handling and Working at height and height rescue due to the severity of incidents related to working within the turbines. As such, Vestas ensured that she and her sub-contractors receive these trainings hence the large number of employees trained in these capacities. With 59% and 58% of the employees trained in Fire-fighting and First Aid respectively, 41.3% trained in manual handling and 43.4% and 28% of the employees trained in Working at height and Height rescue. It is to be noted at this point that most of the employees trained were those that were directly involved in working within the turbines part of the installation team, service team and their team leaders.

Additional training in Safety and Health to increase the employee capacity to manage own Safety and Health during task execution was tested against the occurrence of OHS incidents and injuries, and increase in confidence in the OSHMS. The results were as follows:

Association Between additional training versus employee feeling safe and occurrence of OHS related incidents and injuries		
	χ^2	**P Value**
Additional HS training and employee feeling safe (confidence in OSHMS)	12.080	0.002
Additional HS training and occurrence on OHS incidents and injuries	4.135	0.051

Table 4:4 Chi-square test of independence between training and feeling safe and between training and occurrence of OHS related incidents and injuries
***Source**: Field data*

The table 4.4 shows that there is no significant statistical independence between an employee having additional training and the employee being involved in an OHS incident or injury. The P Value in this case is 0.051 which is greater that 0.05 (95% level of significance). This means that an employee could be involved in occupational incidences or injuries even though they have health and safety training.

However, there is statistical significance association between additional HS training and the employee feeling safe at work (confidence in the OSHMS system). The P value is 0.002 which is less than 0.05 (95% level of significance). One can conclude that such health and safety training helps the employee to feel safe as they work. Research conducted by Mosher (2011) and Gachie (2011), stated that the employee's feeling of safety determines their attitude towards the organizations safety rules, procedures and guidelines and increases trust in the organization's capacity to make decisions that will further safeguard their safety. This has been seen to be significantly related to the individual employee's performance at work, and the overall organizations' performance.

4.2.2 Influence of years of experience on effective OSHMS Implementation

An employee's experience in a task (measured in the number of years) is significantly related to the job performance. MacDaniel (1988) stated that it is the relative, not absolute, individual differences in job experience which produce individual differences in job knowledge and job performance. As such, an employee is thought to be fit for the task based on his experience on performing a given task. Experience on the task is more often than not pegged on the employee's age, where the older the employee, the more the experience on the task. Safety and Health professionals equally seek out the older "more experienced" employees to contribute to the development and the implementation of an effective OSHMS. The research tested this thought and the results are explained in the next paragraph.

Employees with 0-5 years of work experience on the task represented 41.3% which was the most frequent in terms of 5 year categories of work experience. This is illustrated in figure 4:6.

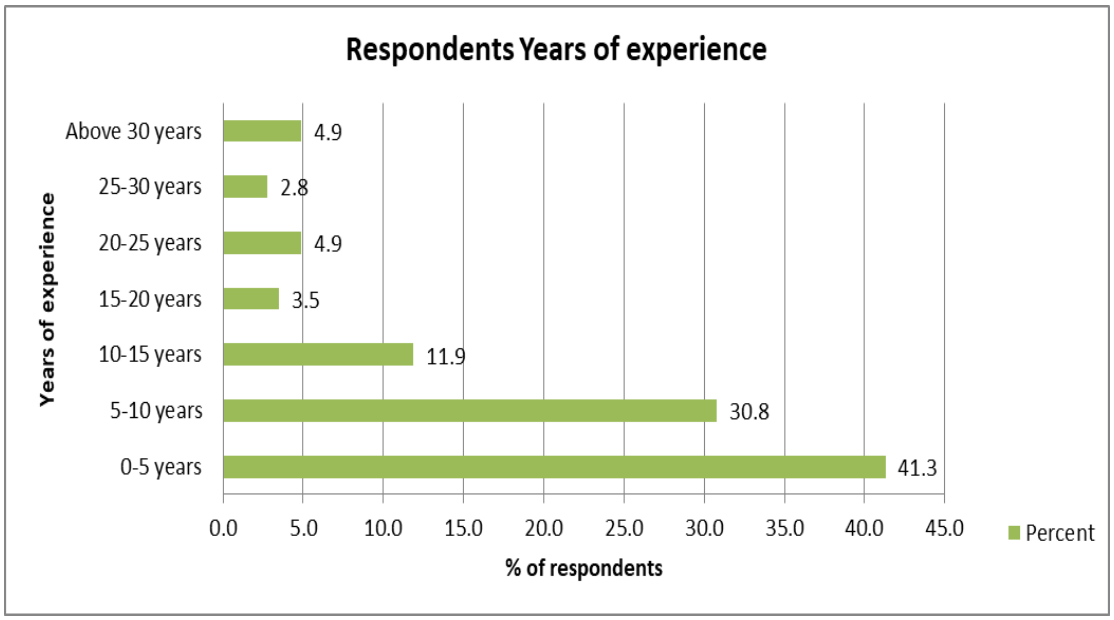


Figure 4:6: Respondents Years of experience
Source: Field Data

The results implies therefore that a majority of the employees are not as experienced for the tasks assigned. This would mean also mean that these employees require more training, supervision, and may not be in advantageous position to make decisions on Safety and Health in regards to the tasks assigned to them. Further tests affirmed a significant relationship between the years of experience of an employee and the involvement of the employee in an OHS incident, satisfaction on the OHS issues addressed, and the confidence in raising OHS issues to the various relevant parties.

Association between Employee experience and involvement in an OHS related incident or injury, satisfaction on how OHS issues are addressed and feedback on OHS issues		
	χ^2	**P Value**
Experience and involvement in an OHS incident or injury	17.034	0.021
Experience and satisfaction on how OHS issues are addressed	14.360	0.029
Experience and giving feedback on OHS issues	15.050	0.012
Experience and participation in OSHMS implementation	26.069	0.012

Table 4:5 Chi-square test of independence between experience and involvement in an OHS related incident or injury; between experience and satisfaction on how OHS issues are addressed; and between experience and feedback on OHS issues and between experience and participation in OSHMS implementation

Source: Field data

A statistical significance was seen in the test of independence between the employees work experience (years of experience) and their involvement in occupational injuries and incidences. The P -value was seen to be 0.012 which is less that 0.05 (95% level of

significance). Additionally, a statistical significance was seen between the work experience and their satisfaction in how well the health and safety issues have been addressed by the management. In this case the *P*-value was seen to be 0.029 which is less than 0.05 (95% level of significance). Further, a statistical significance was also seen in the relationship between the work experience and willingness to give feeback on OHS issues to management. The *P*-value was in this case found to be 0.012 which is less than 0.05 (95% level of significance). Once could conclude that an employee's years of experience in any particular task in influences their overall outlook of OSHMS. They will have lower chances of being involves in occupational injuries and illnesses, higher chances of giving and receiving feedback on OHS from management and overall participation in the implementation of OSHMS.

4.2.3 Association between employee differences and OSHMS implementation

The researcher went ahead to test, using the statistical tool (SPSS V23), the degrees of associations between the different elements of an individual's capacity and the different elements of OSHMS implementation that require the participation of the employees.

Chi-square test of independence between individual capacity (age, gender, culture, education, experience) and feedback on OHS issues resulted in the figures shown in table 4.7:

Association between individual capacity and feedback on OHS issues		
	χ^2	**P Value**
Gender and feedback on OHS issues	0.880	1.0
Age and feedback in OHS issues	13.607	0.004
Education and feedback on OHS issues	2.289	0.765
Experience and feedback on OHS issues	15.050	0.012
Culture and feedback on OHS issues	2.481	0.674

Table 4:6 Chi-square test of independence between individual capacity and feedback on OHS issues

As shown on table 4:6 , there is no statistical significance between an employee's gender, education, culture and his response on OHS issues since the P values of these associations are greater than 0.05 (95% level of significance).

However, there is statistical significance between the employee's age, and experience, and their feedback on OHS issues since the P values (0.004 and 0.012) are less than 0.05(95% level of significance. Age and experience could be seen to be directly related as the older employees had more experience in the tasks assigned than the younger employees.

The ability of an employee to give feedback on OSHMS indicates an understanding on the task being undertaken, appreciation of Safety and Health as a discipline and how it relates to the task, and confidence in knowing that his or her feedback on the OSHMS will result in an improvement in the system. Further discussion with the employees pointed out that some employees are afraid of: being victimized management, highlighting some issues which may land them or their colleagues in trouble or that no change will be realized even if they raise these concerns and would rather be contented with things as they are.

Similarly, the test looked into the relationship between employee satisfaction on how OHS issues are addressed and the employee's individual capacity. The results are as table 4:7:

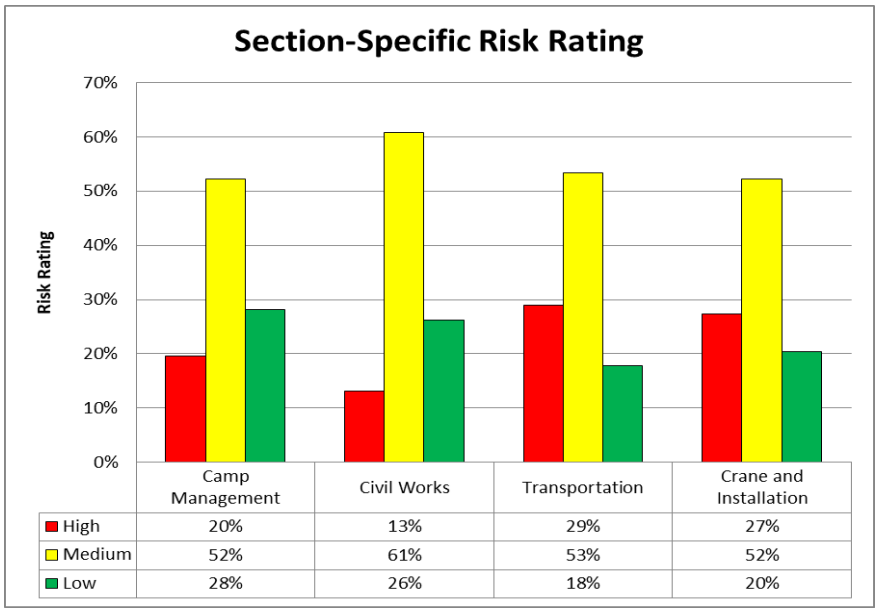
Relationship between employee satisfaction on how OHS issues are addressed and the employee's individual capacity		
	χ^2	**P Value**
Gender and satisfaction on how OHS issues are addressed	0.158	1.0
Age and satisfaction on how OHS issues are addressed	14.448	0.009
Education and satisfaction on how OHS issues are addressed	5.9	0.24
Experience and satisfaction on how OHS issues are addressed	14.36	0.029
Culture and satisfaction on how OHS issues are addressed	5.186	0.243

Table 4:7 Chi-square test of independence between employee satisfaction on how OHS issues are addressed and the employee's individual capacity

There is a statistical significance relationship between an employee's age and his or her satisfaction on how OHS issues are addressed. P value is 0.009 which is less than 0.05 (95% level of significance). A statistical significance is equally seen in the relationship between the employee's experience and his or her satisfaction on how OHS issues raised are addressed. As was discussed earlier, a direct link between age and experience could be the reason why there is similarities in their associations with different aspects of OHS implementation. However, from table 4:7 no statistical significance can be drawn in the relationship between an employee's education, gender or culture to his or her satisfaction on how OHS issues are addressed.

4.3 Adequacies and Inadequacies in Employee Capacity Needs for OSHMS Implementation

A comprehensive risk assessment matrix was developed from the Vestas Global OHS manual, Kenyan Legal Safety and Health requirements and International Safety and Health guidelines (from IFC Performance standards and ILO guidelines). The risk assessment highlighted and categorized the risks on the basis of the likelihood and severity of the risks. A section-specific risk rating is as shown on figure 4:7:



	Camp Management	Civil Works	Transportation	Crane and Installation
High	20%	13%	29%	27%
Medium	52%	61%	53%	52%
Low	28%	26%	18%	20%

Figure 4:7: Section-specific risk rating
Source: Vestas Health Safety and Environment Manual

Transportation and Crane and Installation presented the highest number of high-risk tasks while civil works presented the highest number of medium risk tasks. Overall, the total project Safety and Health risk rating is as shown on the graph in figure 4.8 with the highest number of medium risk tasks being identified.

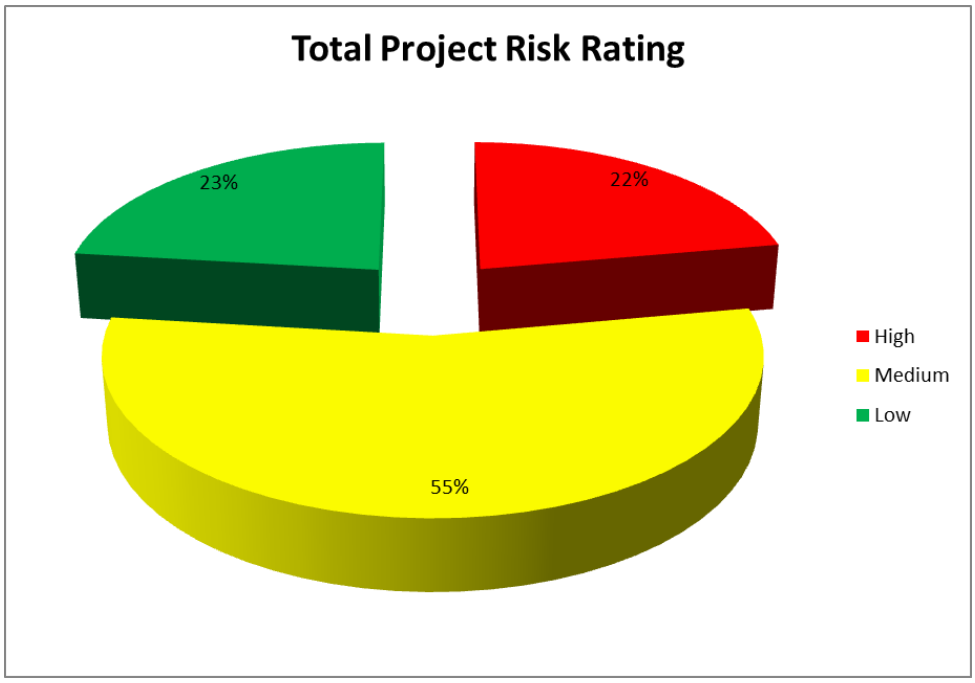


Figure 4:8: Total project risk rating
Source: Vestas Health Safety and Environment Manual

Based on the risk rating, Vestas Eastern Africa could identify the key risk area, develop ways to manage these risks and where possible eliminate the risks. The hierarchy of controls was majorly used to manage these risks working mainly to eliminate these risks and where elimination of risks, engineering controls on the tasks or isolation of tasks was not possible the use of personal Protection Equipment (PPE) was adopted.

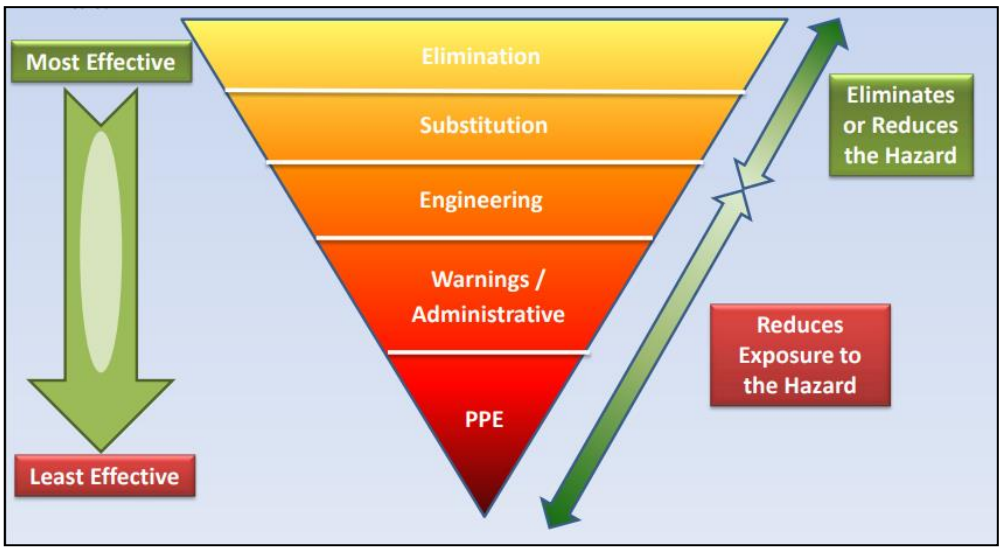


Figure 4:9: Hierarchy of Safety and Health controls.
Source: https://riskmanagement.nd.edu/ Accessed on 8th May, 2018

Based on the risk ratings and hierarchy of controls, the management was able to identify what areas could adequately be managed by the employees based on their different capacities, and what areas required additional capacity building in order to achieve effectively the company objectives.

Employees' individual capacities were also assessed for adequacies or inadequacies for the effective implementation of the OSHMS. The researcher reviewed the Training Needs Assessment (TNA) report for Vestas eastern Africa Limited for gaps which required additional training in order to improve the individual's capacity for effective OSHMS implementation. The TNA report identified the employees' level of education, any relevant additional training, and years of experience as the baseline for identification of the training needs based on the tasks assigned (and the hazards they are exposed to) and their level in management.

Their levels of education are as shown in figure 4:*3* and their years of experience shown in figure 4:6. As was shown on table 4:5, employees had additional training in order to improve the companies' OHS capacities. These made it easier for the companies to champion for the implementation of the OSHMS. The results of the TNA are as depicted on table 4:8:

Target groups	Key training requirements	%age to be trained	Previous %age of trained pers	Actual %age trained	Training gap	Acceptable?
All Employees	Site Health and Safety Induction	100.00%	0.00%	96.00%	4.00%	Y
Service Technicians, Steel Fitters (Turbine erection team), Selected employees from EGMF and Bollore	First Aid	50.00%	3.00%	38.00%	12.00%	N
All Employees	Basic Fire Fighting	50.00%	0.70%	21.60%	28.40%	N
Selected employees from each company	Fire Marshal	20.00%	0.00%	0.00%	20.00%	N
Service Technicians, Steel Fitters (Turbine erection team)	GWO Height Rescue	50.00%	0.40%	50.00%	0.00%	Y
Service Technicians, Steel Fitters (Turbine erection team)	GWO Advanced Height Rescue	50.00%	0.40%	23.00%	27.00%	N
Service Technicians, Steel Fitters (Turbine erection team), Heavy machinery operators, Metal workers, Housekeeping team, Management team	Manual handling	75.00%	0.40%	31.00%	44.00%	N
All Employees	Incident Reporting	100.00%	0.00%	47.00%	53.00%	N
	Additional OHS training					
All Drivers	Advanced driving training		0.00%	12.80%	87.20%	N
All Employees	General Construction Safety Hazards		0.00%	8.00%	92.00%	N
All Employees	Radio Protocal Awareness		0.00%	62.00%	38.00%	N
All Employees	Lost Man Management		0.00%	10.00%	90.00%	N
Selected Employees from each company, Designated First Aid team, Housekeepers, Surveyors	Snake Handling		0.00%	4.00%	96.00%	N
All Employees	Sexually Transmitted Diseases		0.00%	22.00%	78.00%	N
All Employees	Housekeeping		0.00%	65.00%	35.00%	Y
All Employees	Emergency Preparedness		0.09%	68.00%	32.00%	N
All Employees	Crane Safety		0.40%	42.00%	58.00%	Y
All Employees	Waste Segregation		0.06%	33.00%	67.00%	N
Drivers, Heavy Machie Operators and their Assitants, Supervisors, Management team	Loading and Offloading		0.60%	7.60%	92.40%	N
Warehouse Staff, Service Technicians, Steel Fitters (Turbine Erection Team)	Chemical Handling		0.00%	8.00%	92.00%	Y
All Employees	Alcohol and Drugs		0.00%	52.00%	48.00%	Y
All Employees	Grievance Mechanism		0.00%	57.00%	43.00%	N
All Employees	Excavation Safety		0.00%	24.00%	76.00%	Y
All Employees	Proper use of Personal Protective Equipment		1.90%	37.00%	63.00%	Y

Key			
GWO	Global Wind Organization		
Y	Yes		
N	No		

Table 4:8 Training Needs Assessment Matrix for Vestas Eastern Africa Limited.
Source: Documents review.

As per the report matrix on table 4:8, only 29.17% of the training needs were found to be acceptable for effective OHS implementation. This shows that a majority of the training needs identified as necessary for the project's success as regards Safety and Health had not been fulfilled. Emphasis was mainly put on the key OHS requirements. A review of the Vestas OHS manual showed that these key requirements were the basic requirement according to the Vestas OSHMS. Less emphasis was put on trainings that were not identified as the key requirements as per the Vestas OSHSMS. These additional training needs were identified during the companies' risk assessments, lessons learnt from OHS incidents (likelihood and severity), and any changes to known procedures due to weather, timelines, employee capacity among others.

The researcher then analyzed the application of these trainings on different elements of the OSHMS such as communication, OHS reporting of incidents, involvement in OHS audits. Given the random nature of the trainings, the assumption made by the researcher is that, regardless of the kind of training, any form of OHS training will directly or indirectly impact in any of these elements of OSHMS. This could be through additional knowledge in the field, more confidence in fronting OHS issues, improved decision making in regards to OHS all of which lead to overall improved OHS management.

A number of tools were used for training and capacity building within the various companies. Tool box talks and scheduled specialized trainings were the main tools that were used by these companies to improve their employees' level of awareness in regards to OHS management and individual OHS responsibility. Specialized trainings were not frequent, and in some cases, they were conducted as part of the recommended improvements after a significant OHS incident. Toolbox talks were however more frequent. Toolbox talks brief talks on different OHS topics discussed with members of different teams. The topics are normally selected based on the types and levels of risks identified depending on the tasks assigned. In each company, attendance of these talks was mandatory.

The effectiveness of employee capacity building was tested against the company's key objectives of realizing zero injuries within the course of the project and also realizing 100% compliance to relevant legislature and standards.

Chi square two-tailed test was applied to test the association between employees' attendance of toolbox talks (TBT) and the probability of the respondent being involved in an incident was conducted. P value was found to be 0.03 which is lower than 0.05 (95% level of significance) as shown in table 4:9. There is therefore a statistical significance association between attendance of the toolbox talks and involvement in an OHS incident.

Relationship between employees' attendance of toolbox talks (TBT) and the probability of the respondent being involved in an incident		
	χ^2	**P Value**
Attendance of TBT and involvement in OHS incidents	5.045	0.03

Table 4:9 Relationship between employees' attendance of toolbox talks (TBT) and the probability of the respondent being involved in an incident

The conclusion of the above test could be that an employee who, through the toolbox talks, has been made aware of the hazards linked to specific tasks will be in a better position to keep himself safe from risk of injury due to better judgement of these risks, better decision making on safe or unsafe acts, and higher chances of correcting or reporting unsafe situations.

To further substantiate this claim, the Figure 4:10 shows a clear reduction in the number of OHS incidents within the course of the project, and an increase in reported Near Miss cases.

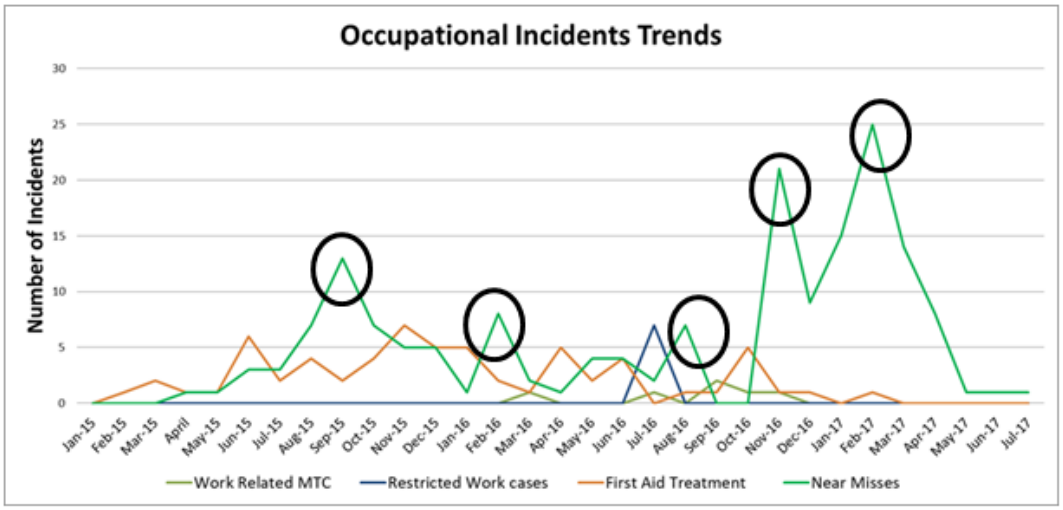


Figure 4:10: Occupational Incident trends
Source: Vestas Management System

From the figire 4.10 illustration, a high record of near misses (marked with O) were consequently marked with a low record of First Aid cases, work related MTC and restricted work cases. Near Misses are the incidents which could have happened but did not happen. For

instance an employee trips on a stone but does not fall, or a spill is noted on the floor that could have caused an employee to fall but was identified before it caused any injury. Reporting of Near misses (in this study it includes the unsafe acts and unsafe conditions), reduces the chances of an employee being involved in an incident (Radvanska, 2010). Figure 4:11, depicting Heinrich's Accident Triangle, clarifies this fact.

Figure 4:11: Heinrich's Accident Triangle
Source: Radvanska (2010)

Additional training on OHS and the toolbox talks to increasing the employees' level of awareness on hazards and risks related to the tasks they do which made them more alert and more willing to share their hazardous observations which in turn reduced the occurrence of OHS incidents (injuries and accidents). A translation of Heinrich's Accident triangle on the Vestas recorded incidents can be seen in figure 4:12.

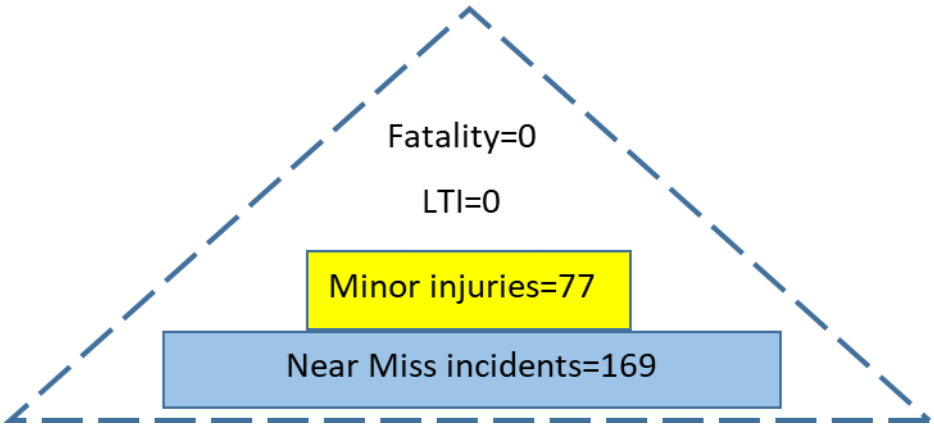


Figure 4:12: Vestas Eastern Africa (LTWP Project) Incident Pyramid.
Source: Vestas Management System

4.3.1 Effects of Improved Employee Capacity on OHS Compliance Audits

To ensure continuous and constant control over these risks, Vestas Eastern Africa Limited identified two key performance indices to benchmark the performance of its OSHMS: Safety and Health Compliance Audits and OHS incident and injury rates. Conducting OHS compliance audits are considered active monitoring while analyzing OHS incident and injury rates are considered re-active monitoring. An overview of these Compliance Audits reports and the OHS incidents and injury rates will be further expounded later in this report.

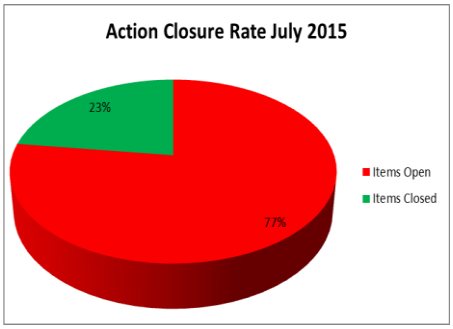
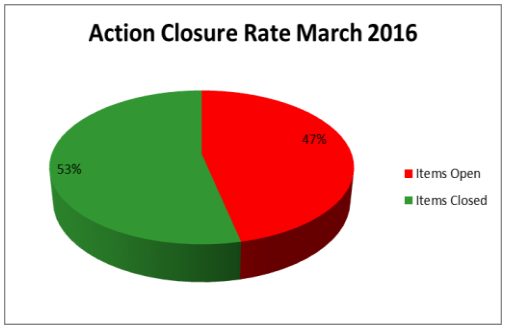
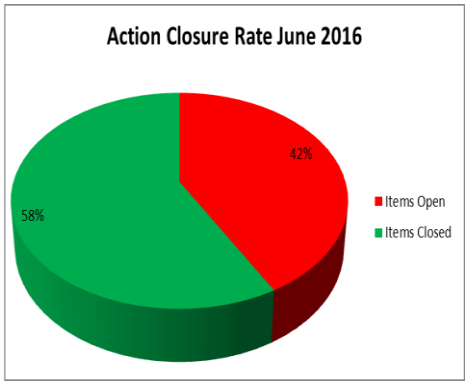
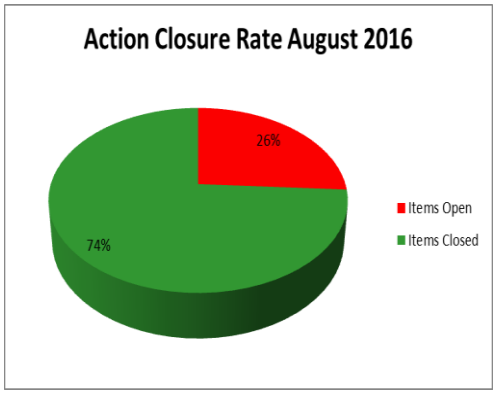
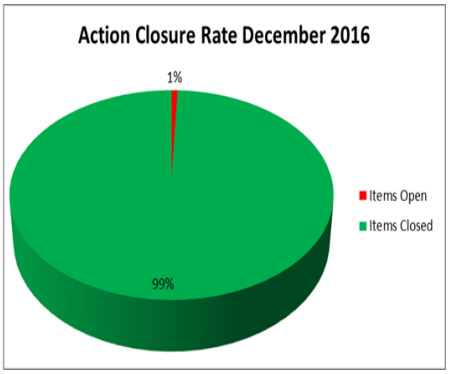
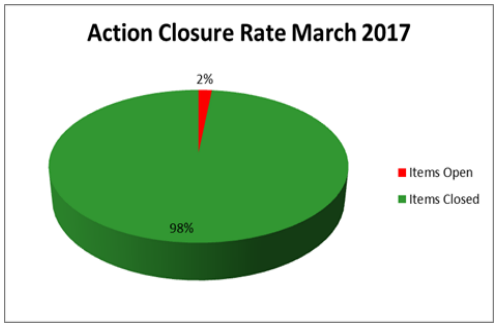
Contractor 2 (Civil work)	Contractor 1 (Crane and Installation)
	
	
	

Table 4:10 Action closure rate between two contractors supervised by Vestas Eastern Africa

Audit results from two contractors whose data was availed for the research showed a consistent improvement in the audit scores. The table 4.10, shows a comparison of two subcontractors who were supervised by Vestas Eastern Africa. According to Vestas OSHMS, monthly audits were to be conducted by competent personnel to ensure continuous performance improvement and consistency in compliance to the local and international laws and best practices detailed in the risk assessment that had been developed.

The Crane and installation contractor joined the project in March 2016 while the civil work contractor joined the project earlier in January 2015. The Vestas Eastern Africa OSHMS was developed within the month of July 2015 after which consistent sectional audits were conducted. As can be shown in table 4.10, both contractors began the works with many OHS gaps which were gradually and consistently closed. The Civil work contractor had 77% of the risk items not addressed while the Crane and Installation contractor had 47% of the risk items not addressed.

Further discussions with the management teams for these contractors identified the challenges faced at the onset of the project. For the Civil work contractor, firstly, Vestas Eastern Africa had not shared the risk assessment document with the contractor to enable her to effect the controls prior to the beginning of the project. The wind industry being a relatively new concept in Kenya, the civil work contractor needed guidance first hand before the take-off of the project from the main contractor. Secondly, the civil work contractor management was not supportive in regards to effecting OHS controls. The poor safety culture of the company, based on history working specifically in Kenya where Safety and Health is not yet a welcome idea, was blamed for this culture. The management was therefore willing to support partly the last control measure in the hierarchy of controls which is the provision of PPE. Thirdly, locally sourced employees, who were to constitute at least 20% of the contractor's human resource, did not have previous skills, work experience or any training in regards to the tasks assigned. Their pastoralist lifestyle made it difficult to even implement the last control in the hierarchy of OHS controls. PPE were not well worn, most of the local employees could not understand the national language, Swahili, or English making communication an uphill task.

The Crane and Installation contractor's main hurdle was the haste at which the contract was drawn, and the time limit for mobilizing the team to the project area. Being an international contractor, their human resource was well mobilized, with the relevant PPE availed. However, the safety equipment for the intended tasks such as the safety harnesses, appropriate scaffolds, safety signage, and fire extinguishers among others delayed in both acquisition and provision. Management support and availability of financial resources however enabled the contractor to close out the open risk items within a relatively shorter time than the civil work contractor.

12.5% of the managers interviewed stated however that they do not conduct regular audits to check and review their company's OSHMS performance. 50% however do not benchmark their performance against other competitor's in the market. Benchmarking of OSHMS performance aims at continuous improvement of the OSHMS and guides the company away from engaging in unsafe activities through learning from others in the market.

Apart from availing safety components as a means to increase employee capacity, different training opportunities, other than the toolbox talks and the Site Safety induction, were offered to different employees in order to enable them to perform their assigned tasks in a safer way. 60% of the respondents stated that had received additional OHS training in First Aid, Fire-fighting, manual handling, working at height among others as shown on figure 4:13.

Figure 4:13: Employees with additional Safety and Health training other than induction
Source: Field Data

A test of independence between these additional trainings and the occurrence of OHS incident however found that there is a no significant statistical relationship between the additional OHS trainings and the occurrence of OHS incidents (as shown in table 4:11). The value of *p* was found to be 0.051 which is more than 0.05 (95% level of significance).

Relationship between a and b		
	χ^2	**P Value**
Additional training in OHS and involvement in OSH incidents	4.135	0.051
Additional training in OHS and employee feeling safe	12.969	0.002

Table 4:11 Chi-square test of independence between additional training in OHS and involvement in OHS incidents and employee feeling safe

However, a statistical significance relationship was found between such trainings and how safe an employee feels. The value of *p* was found to be 0.002 which is less than 0.05 (95% level of significance). How safe an employee feels ties in with the employees' attitude towards OSHMS elements and their reception to OHS responsibilities and towards the company as a whole. A safe employee is a more satisfied employee and therefore a more loyal employee. The research could however not find a direct link between the company's improvement in OHS compliance and the respective additional training.

4.3.2 Communication in Safety and Health

Communication is key in regards to Safety and Health management. Communication should be a two way process. Both the employees and the employers are to communicate effectively in order to impact positive change in OHS. Effective communication is key in the effective implementation of OSHMS (Vecchio-Sadus, 2007). Not only does effective communication enhance is key to effective training and capacity building in OHS management, but also training ensures effective communication. Vecchio-Sadus (2007) states that our communication on safety influences whether or not people will internalize and willingly participate in safety and health management. The different avenues of training are also considered avenues of communication, and once the employee is trained on the various Safety and Health areas, they are in a better position to communicate their Safety and Health concerns to the responsible persons.

Respondents were asked what means of communication was used to train them on the Vestas Safety and Health Policy. From figure 4.14, 71.3% got to know of the Vestas HS policy through toolbox talks, 64% through Safety and Health Induction, while 21.7% got to know through reading on the Safety and Health display boards.

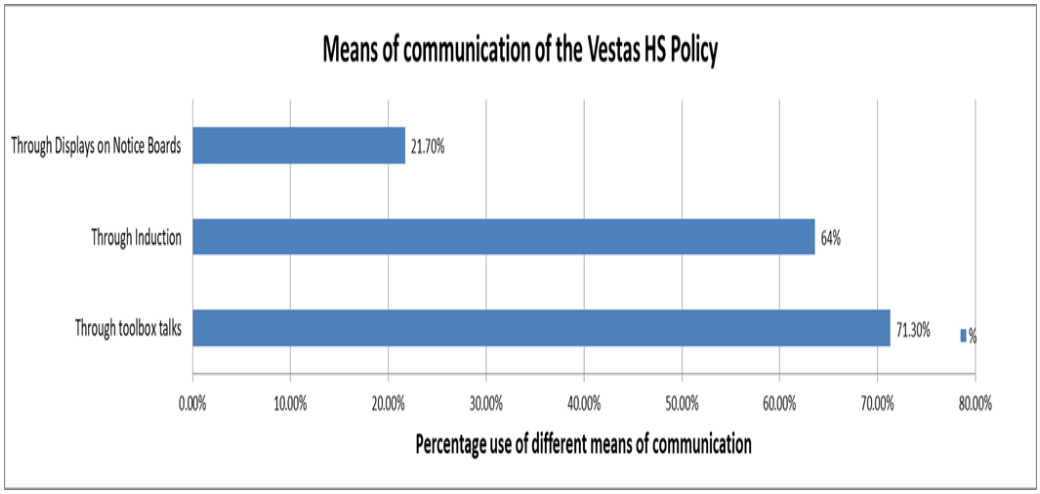


Figure 4:14: Means of communication of the Vestas HS Policy
Source: Field data

It is to be noted that the Vestas OHS policy details the management commitment toward Safety and Health, what will be required of the employee in regards to Safety and Health, disciplinary measure in the event OHS rules are violated, and OHS reporting structure. It also details the responsibilities of the management team members and the employees in regards to health and safety. It is a vital document that also outlines the company's health and safety goals and objectives, vision and mission, key performance indicators, a;; of which are used by the company to check the performance of the OSHMS.

Statistically, no significance relationship was found between knowledge of the Safety and Health Policy and the occurrence of OHS incidents. P Value was found to be 0.727 which is higher than 0.05 (95% level of significance). However, there was found to be a statistical significance association between knowledge of Safety and Health Policies and the employee feeling safe. The P Value was in this instance found to be 0.013 which is less than 0.05 (95% level of significance). In conclusion, being aware of the company's health and safety policy would make the employee feel safer but this would not be preventive to them being involved in occupational incidents.

Association between a and b		
	χ^2	**P Value**
Knowledge of Safety and Health Policies and involvement in OHS incidents	8.890	0.727
Knowledge of Safety and Health Policies and employee feeling safe	0.149	0.013

Table 4:12 Association between knowledge of Safety and Health Policies and involvement in OHS incidents and employee feeling safe

The respondents were also asked whether they use the given avenues to give feedback on OHS matters to management and what their preferred avenues of such communication was. Impressively 94% stated that they give feedback while 6% stated that they do not. This is an improvement from an earlier response survey conducted by the company which showed that only 15% gave feedback on OHS to management.

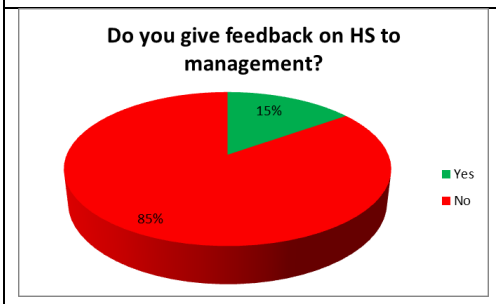
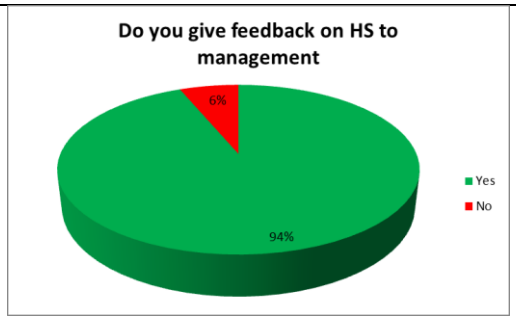
Previous response	**Current response**
	

Table 4:13 Comparison percentage feedback given to management

Respondents who did not give feedback on HS to management further stated their reasons as being either they were afraid of victimization, they are yet to see response from management on other issues raised, or some did not have any particular reason. Those who give feedback freely stated that they have seen improvement on their Safety and Health since they started giving feedback to management, or they are aiming to get rewarded (physical rewards or picked for management and training opportunities), or simply because it is the right thing to do. It is important to note that some of those that give feedback stated that their feedback was based on that which they have recently been trained on.

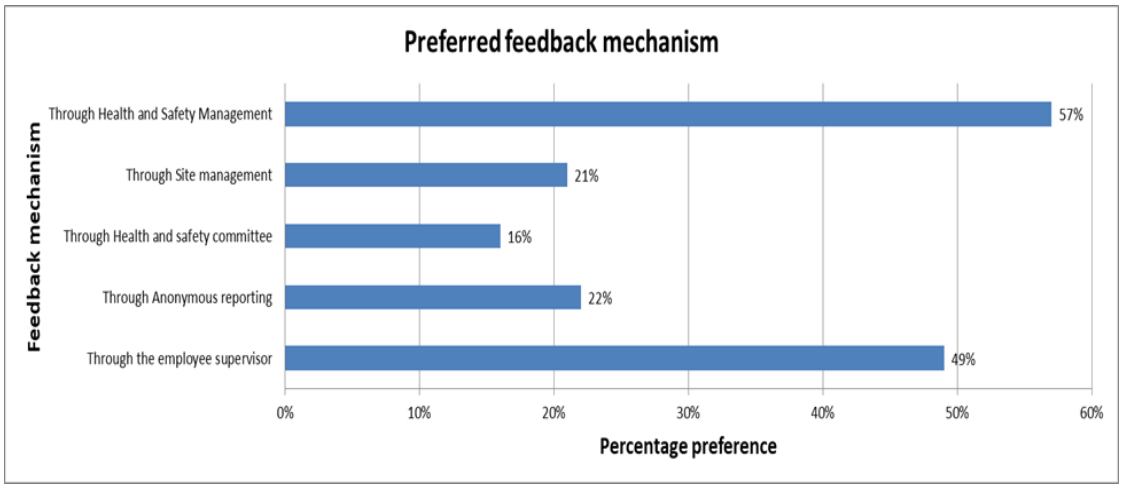


Figure 4:15: Preferred feedback mechanism
Source: Field data

Preferred avenue of feedback ties in with confidence of the worker in the authority to make change, and also could be due to a friendship developed at work. 57% stated that they prefer to communicate through the Safety and Health management of their company, 49% through the employee supervisor, 22% and 21% through anonymous reporting and site management respectively while 16% prefer to communicate through the company's Safety and Health Committee. Respondents further stated that their preferred communication channel was mainly based on the persons that they regularly interact with (Safety and Health Officers and the employee supervisors). The only times they can interact with the site management is during toolbox talks in the morning. These talks are normally brief and include the rest of the employees giving them limited time to interact with site management. When asked whether they are at liberty to visit management in their officer, many were quick to state that the management team is rarely in their offices, and if they are in their offices, they are attending meetings or are too busy to have discussions with them. As for the Safety and Health committee, it was unanimous from the respondents from different companies that the Safety and Health committee is virtually non-existent, with some respondents stating that they are not even aware that there exists a Safety and Health management committee. The specific company documents however state clearly the names and designations of the elected Safety and Health committee members.

98% of the respondents stated that they do indeed receive feedback from management on the HS issues they raised, and only 12% were not satisfied with the responses given. An employee is encouraged to communicate further with management if feedback is given on issues raised. Positive attitude towards the OSHMS is as a result of open avenues to give feedback, avenues to receive feedback and satisfaction of the feedback given.

87.5% of the management team interviewed agreed to that management is not open and approachable to the employees, further hampering communication. 87.5% added that management doesn't equally communicate to the employees through leading by example even though they are aware of their responsibilities in regards to Safety and Health Management. In support of this statement, only 62.5% stated that their management team is aware of their responsibilities in regards to Safety and Health management.

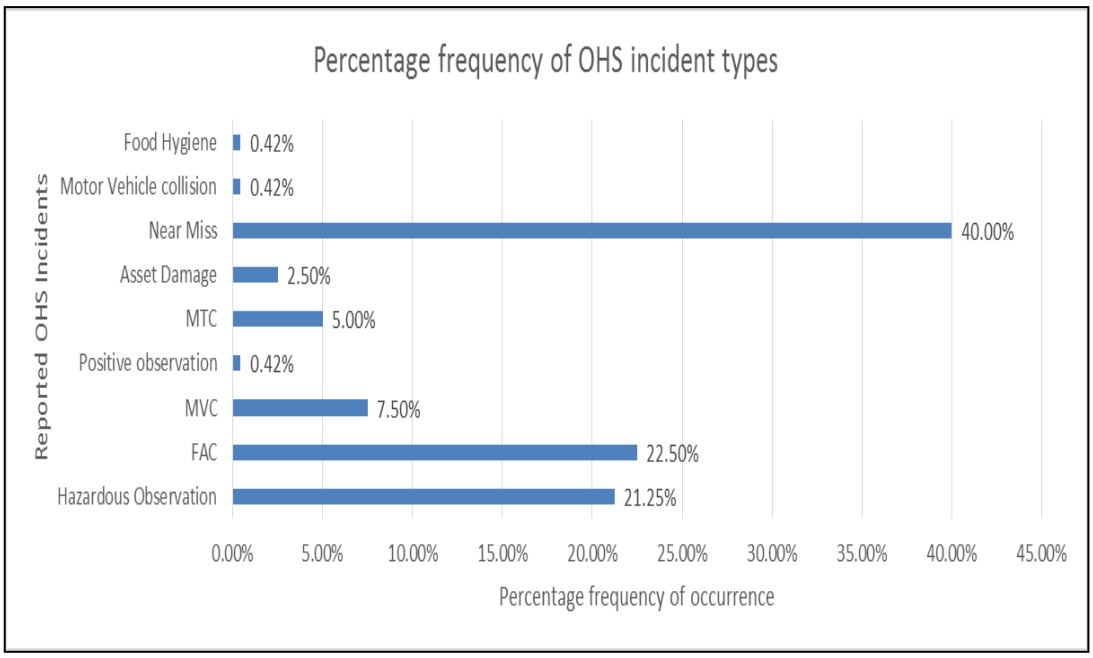


Figure 4:16: Percentage frequency of OHS incident types
Source: Field data

4.3.3 Personal Protection Equipment and effective OSHMS implementation

Apart from training, employee capacity was enhanced through the provision of personal protection equipment. Provision of PPE is the last defense between an employee and a possible injury. In this study 76% of the respondents stated that the PPE were provided as often as the employee required while 16% had their PPE replaced annually. 2.8% stated that they never had their PPE replaced (See Figure 4:17). The Vestas OSHMS manual doesn't explicitly state the frequency of PPE replacement by their team neither by their contractors. Vaguely, the manual states that the PPE provided will be 'adequate and suitable' for the task assigned. This could be interpreted in a many ways by the different management teams, some of which may not be considered adequate by the employees.

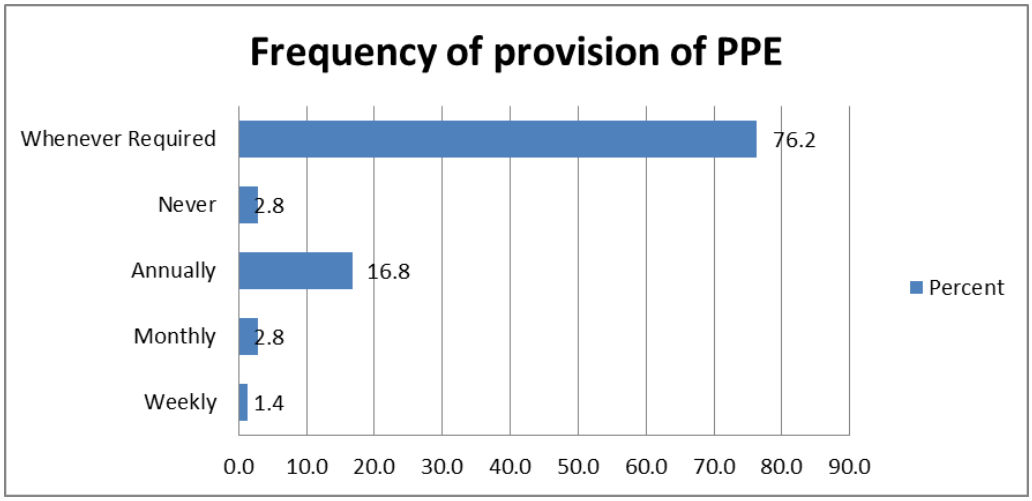


Figure 4:17: Frequency of provision of PPE
Source: Field data

Employees from each company were then grouped depending on whether they are involved in tasks that require heavy manual labour (steel fitters, installers, masons, civil works), tasks that require some level of manual labour (cleaners and machine operators) and those that require minimum manual labour (supervisors, administrators and kitchen staff). Group discussions with the employees gave a number of conflicting responses. While others were confident that the PPE provide were adequate allowing them to perform their work comfortably and safely, a number were not confident with the PPE provided. Employees tasked with heavy manual labour activities stated that they are given the same safety gloves to those that are tasked with undertaking some level of manual labour such as the cleaners. The frequency of having the gloves replaced was however less frequent that they would prefer and they are at times forced to work with damaged gloves for days at a time.

Employees tasked with cleaning of the turbines on the other hand stated that the gloves issued to them were not suited for the tasks assigned to them and they only used them when they felt it was absolutely necessary. They were of the opinion that the gloves assigned were more hazardous since they are slippery when wet. The cleaners were also uncomfortable with the safety boots assigned to them. Only one pair of safety boots was assigned to them. In the event the boots become wet comfort of using them significantly reduced and chances of getting foot infections increased. Clinical reports did not however indicate a significant number of foot related illnesses that could be as a result of poor foot hygiene.

On PPE, another significant issue was that of the suitability of the PPE issued to the employees' physique. Although this was a relatively smaller group of people, representing approximately 10% of the respondents, the employees whose physique was larger or smaller than the average were finding difficulty to have PPE (safety boots, safety overalls and safety harnesses) that could comfortably fit them to enable them to perform their duties well. PPE that are oversize or tight fitting present a hazard to the employee using them.

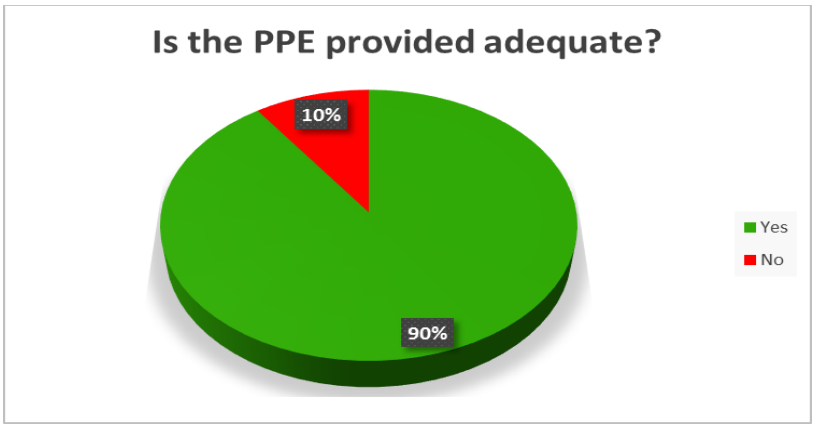


Figure 4:18: Adequacy of PPE issued to employees
Source: Field data

The researcher further tested whether there is any relationship between provision of PPE and the occurrence of OHS incidents. The result was that there is indeed statistical significance association between the provision of PPE to the employees and the occurrence of OHS incidents. P value is 0.018 which is less than 0.05 (95% level of significance).

Relationship between a and b		
	χ^2	**P Value**
Provision of PPE and involvement in OHS incidents	5.726	0.018

Table 4:14 Relationship between provision of PPE and the occurrence of OHS incidents

Table 4.14 implies that the number of incidents that occurred during the implementation of the project, could be as a result of the suitability and adequacy of the PPE provided. It is therefore important for the management teams to carefully analyze the risks arising from the different tasks before purchasing the PPE. Additionally, consideration should be put to the employees whose physical stature may be less than or above average prior to the start of the project. Effective communication on the use and adequacy of the PPE between the management team and the employees may guide the management team on the most appropriate PPE. Non-use of

PPE or improper use of these PPE hampers the effective implementation of the company's OSHMS since this is significantly associated with the occurrence of OHS incidents.

4.4 Influence of Employee Capacity Gaps on Safety and Health Trends

Analysis of data in sections 4.2 and 4.3 shows that indeed to employee capacity gaps influence some aspects of the Safety and Health management system. Specifically, the occurrence of OHS incidents, Safety and Health communication and Safety and Health compliance or lack thereof, are to different extents affected by the employee capacity gaps. This section aims to see the influence of such gaps Safety and Health trends.

4.4.1 Trends in occupational injuries

Over the period in which Vestas Eastern Africa constructed the Lake Turkana Wind Power Project (Commencement date-January 2015, completion date – July 2017), the contractor and her subcontractor recorded the occupational injuries, incidents, near misses for the purposes of identifying any trends that may emerge given the numerous OHS management strategies that were implemented. Within this period, the total number of incidents are as indicated on figure 4:19:

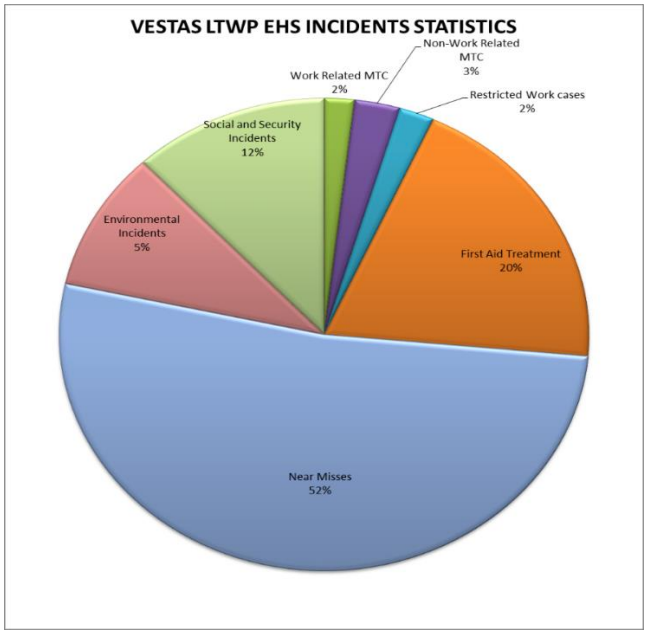


Figure 4:19: Vestas EHS recorded incidents within the course of the construction phase.

As can be seen in Figure 4:20, 52% of the reported incidents were near miss incidents (including the hazardous observations and unsafe acts). Actual incidents that caused damage

or injury to the personnel, equipment or the environment covered 42% of the reported cases. Of these, 20% were first Aid cases, social and security incidents were 12%, 5% were environmental incidents, work related medical treatment cases (MTCs) and restricted work cases were 2% each while non-work related MTCs were 3%.

Over the construction period, monthly reports showing the number of cases were developed and shared. The researcher used these data to develop a Safety and Health incident trend chart only detailing the significant Safety and Health incident and near misses recorded. Figure 4:21 depicts this trend.

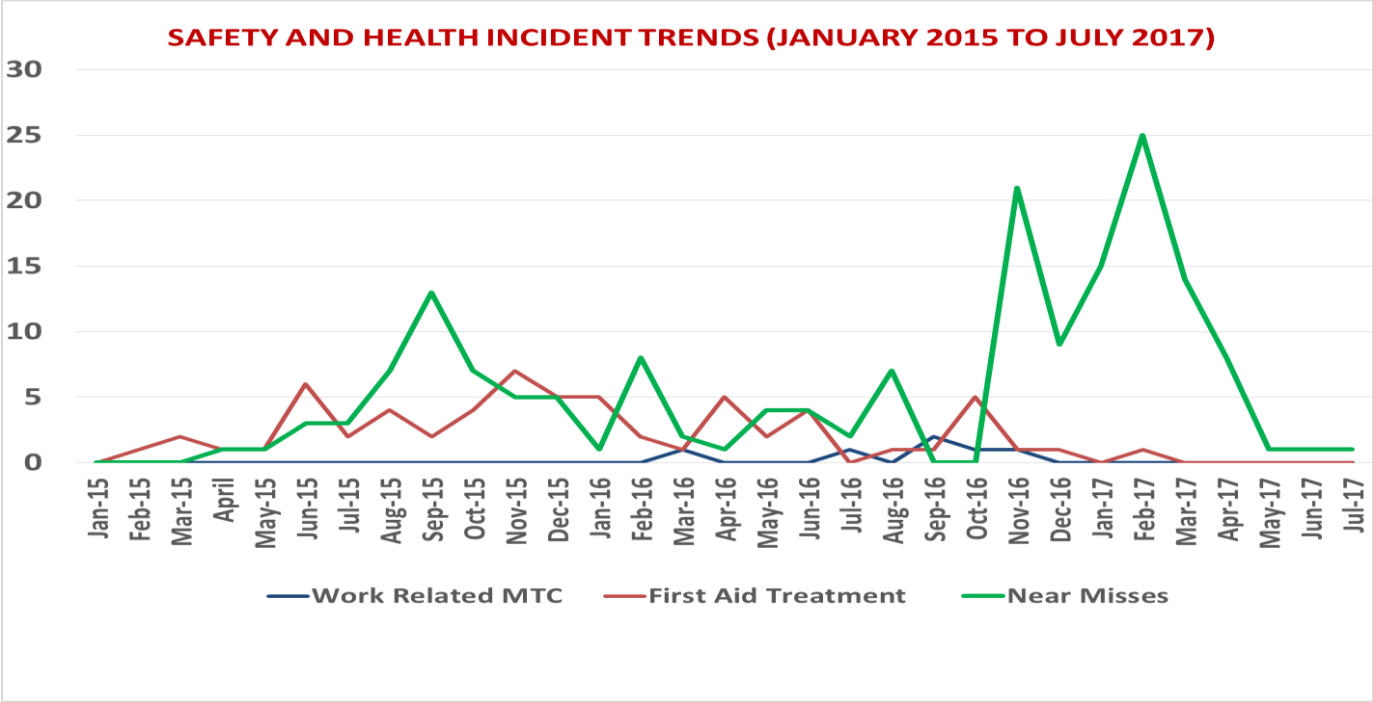


Figure 4:20: Vestas Safety and Health Incident Trends-Construction phase.
Source: Vestas EHS Document review

It is to be noted that in as Vestas management advocates and encourages voluntary reporting of these incidents by the injured or affected person. This is mainly the case for near miss reports where the person might not have suffered personal injury that they have to report in order to receive treatment. Developing the capacity of the employees was in addition to enable to have them to have "safety eyes" where they can be able to observe conditions or actions and identify them as hazardous even before these hazards have injured them or any other party. This reduces the element of "surprise" which often results in actual injury or illnesses.

As seen in figure 4:21 , between January 2015 and June 2015, there were few near miss or hazardous observations recorded. At this time, the main activities at the project area managed by Vestas Eastern Africa Limited were construction of the employees' camp, geotechnical surveys and the start of the excavation of the turbine foundations. A number of issues were identified from the review of documentation and discussions with the civil contractor (EGMF) who was the first to commence their task. First, there was high influx of unskilled labour from the local communities demanding for positions within the company. Unskilled labour, which in the case is not only new labour but temporary labour brings with it a high number of hazards (Belin *et al*, 2011). According to Belin *et al*, (2011) these workers present risks in themselves due to job insecurity, and present a risk to others due to lack of OHS training, and sectoral and occupational segregation. They are reported to have higher rates of occupational diseases and injuries than the permanent employees.

Secondly, a gap in statistics within this period was noted. Reporting structures were yet to be developed by the subcontractor and the main contractor representative was mainly keen on progress of work rather than OHS. The Vestas OSHMS was not yet implemented within this time. These gaps resulted in lack of reporting of the OHS incidents or injuries by the subcontractor.

Within the month of July, as part of the strategies to implement the OSHMS, Vestas Eastern Africa implemented the "Serious About Zero (SAZ)" program. The main objective of the SAZ was to train the employees on the importance of the identifying Safety and Health hazards, empowering those who may be unaware of these hazards, and reporting the identified hazards to the Safety and Health Management team for recording, analysis, follow-up for closure and feedback. In order to encourage the employees to report these hazardous observations, hazardous conditions and near misses, a SAZ award program was introduced

where employees were awarded for the observations they reported. Because of this, a spike is seen in near miss observations reported between the months of July 2015 and September 2015 on figure 4:21. Additional trainings on Safety and Health were conducted after the SAZ training in order to further empower the employees and develop their hazard observation skills.

According to the Vestas Training Matrix, the implementation of the Vestas OSHMS management system strategies began within the month of July with the development of a site specific Vestas OHS induction. Ideally, all the employees were to receive this induction prior to the commencement of any task at the project site. However, the planning and mobilization of the Vestas Management team took longer than was expected, only to have the basic team arrive on site more than six months after the first contractor had arrived on site. The arrival of this team saw additional supervision of the on-going works, and additional training as part of the OSHMS implementation. The "forming" and "storming" phases of the project group saw variations in the number of incidents reported and the number of near misses reported. From the figure 4:21, this variation is seen as from October 2015 to October 2016.

Important to note is that the periods that saw a high recorded number of incidents, there was a lower recorded number of near misses. This could imply that the more people were on the lookout for hazardous observations, the more they knowingly or unknowingly protected themselves from potential injury. The researcher was also informed that the project timelines forced the different management teams to focus more on production. The entire project was to be delivered to the client before April of 2017. Pressure therefore built for production between the months of November 2015 and August 2016 for the civil subcontractor, and between the months of March 2016 and March 2017 for the turbine transportation and installation sub-contractors.

Challenges faced by the Safety and Health Management team included lack of sufficient support (financial, organizational support) for the implementation of the OSHMS management plan, focus by project management on the project timelines, often overlooking employee Safety and Health, unskilled workers willing to put their lives at risk in order to earn a living, supervisors mainly unaware of the potential risks of undertaking tasks they assign to their employees, supervisors unwilling to defend the employees' rights to Safety and Health, focus on the Safety and Health statistics by the project management team to ensure they incident rates remain low (resulted in hiding or manipulating of the OHS data).

The Civil subcontractors (EGMF) completed their tasks by October 2016 and began to demobilize. Focus from then concentrated on the transport and installation subcontractors who were by this time working both during the day and the night. The OHS management team and the supervisors were keen on ensuring that, just as the civil works were completed without any lost time injury, the entire project will equally be completed without any reported lost time injuries. The type and quality of the awards improved and in turn, the number of near miss reported also improved. The motivation of the employees was seen to be, at this point, not the knowledge acquired from the training, and the need to ensure safety but the desire to get the recognition through the SAZ awards program. Even though the motivation is the SAZ Awards program, the employees would not be able to identify and report the SAZ observations without the knowledge acquired through training and capacity building. However, training and capacity building alone does not guarantee the safety of the employees. The employees may have the knowledge required to ensure their safety, but they may not necessarily apply this knowledge accordingly.

4.5 Management Overview of the OSHMS Implementation

The researcher desired to also assess the management thoughts on the performance of the OSHMS. Overall, management scored the various factions of the OSHMS as follows:

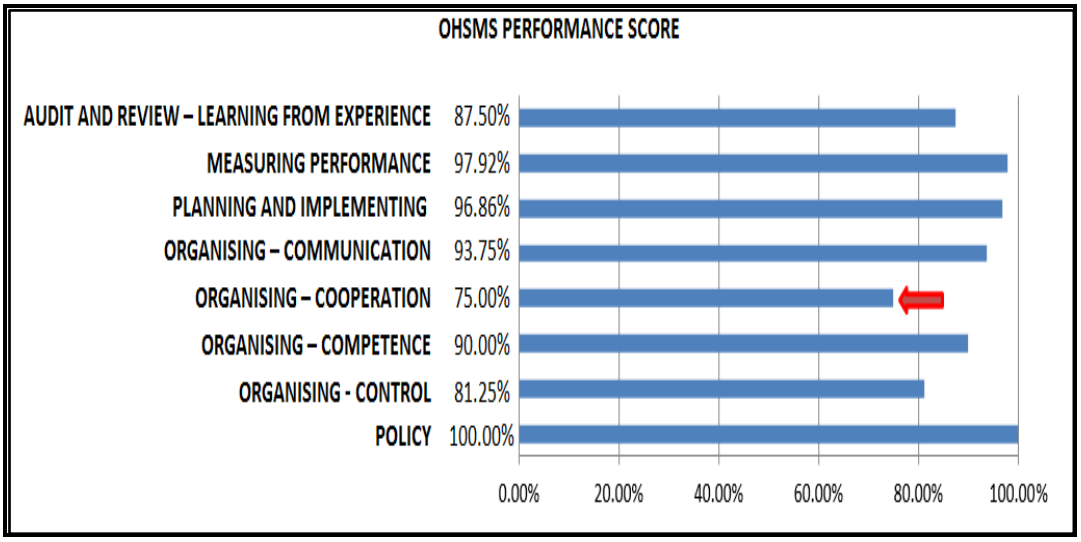


Figure 4:21: OSHMS performance score
Source: Field data

From the management team responses, it was clear that the development and clarity of the OSHMS policy document is commendable with a score of 100%. In testing the policy documentation, the researcher asked questions on: the availability of a written Safety and Health policy that is duly signed, dated and communicated to all the employees; whether Safety and Health of employees was considered as important in conducting general business;

the commitment of the director to continually improve Safety and Health; whether a named manager has overall responsibility to implement Safety and Health; competency of employees to undertake job safely among others.

Of concern is the organization for implementation of the management system which requires cooperation from management team, supervisors, employees and contractors. 37.5% of management thought that the Safety and Health committee put in place was not active in their duties and that the workforce is generally not involved in preparing and reviewing the Safety and Health improvement plans as should be the case which could directly affect the implementation of the OSHMS. 25% were of the opinion that there were no arrangements in place that ensured cooperation and coordination with the contractors whose employees are working for the project. Such cooperation and coordination between the management and employees and the contractors is key in the development and the effective implementation of the OSHMS. Without such cooperation, misunderstandings on the safest ways of performing tasks resulted in the delay of works and in some instances the realization of OHS incidents.

12.5% of the respondents from management thought that their supervisors are neither open nor approachable on Safety and Health matters and they do not encourage their staff to discuss Safety and Health matters. Additionally, 12.5% thought that the directors, manager, and team leaders do not communicate their commitment to Safety and Health through their behavior. 37.5% were of the opinion that the supervisors, managers and team leaders do not know what they have to do in order to fulfill their responsibilities in regards to Safety and Health nor how they will be held accountable. Such managers may be keen on the task being carried out within the stipulated time but not necessarily in a safe manner. From the responses, more attention should be put on the middle managers (supervisors, team leaders and line managers) on what they are meant to do in regards to Safety and Health, the consequences of poor Safety and Health management and how to encourage openness during discussions among themselves or with their subordinate staff. The fact that they are not directly handling the task could be a source of inadequate concern on the Safety and Health of those that are directly handling the tasks.

Performance measurement scored 97.92%. The researcher assessed: the arrangements of monitoring progress and extent to which targets and objectives have been achieved; arrangements for active and reactive monitoring of the control measures in place; assessing,

in the event of poor performance, why this was so; identifying and prioritizing risks; and analysis of potential serious events to identify the possible root causes.

Contractually, all the organizations were to set aside 20% of their project budget for Safety and Health. The researcher was interested in knowing from management which sections of the Safety and Health strategy implementation was adequately or inadequately financed. 25% of the respondents stated that less than 20% of the project budget was allocated for Safety and Health. One respondent was clear to state that less than 1% from their company budget was purposely allocated towards Safety and Health. From the Safety and Health budget, 37.5% of the respondents indicated that more than 30% of the budget was allocated for the purchase of PPE, another 37.5% stated that 20% was allocated for this purpose while 25% stated that less than 5% was allocated for this purpose. It was however unanimous that the budget was still not adequate for the purchase of the PPE. Poor planning and lack of availability of adequate and suitable PPE from the department store, logistical issues given the distance between the project area and any of the PPE sales stores were all sited as a challenge for the provision of PPE to the employees.

Safety equipment such as safe ladders, scaffolds, eye wash stations, spill kits, First Aid equipment were allocated 40% of the Safety and Health budget by one company. Their risk matrix was explicitly used to make the decision to acquire these items. While another 25% of the respondents stated that 30% of the budget was allocated to the acquisition of safety equipment, 50% indicated that less than 10% was allocated siting that the decision was guided by the company's risk matrix based on their activities.

50% of the respondents further stated than there was no budgetary allocation for OHS injuries and incidents within the project Safety and Health budget. Further they stated that the employees were all covered under the Work Injury Benefits Act (WIBA), 2007 insurance in the event of an OHS injury or illness. Only one company, however had evidence to support this claim. The severity and duration of work place injury or illnesses is to a large extent unknown. In as much as many of the companies can generally predict when and how serious the next accident will be based on previous trends and past and present controls, the financial implication of such incidents can be severe to the company. The presence of WIBA insurance policy covering the employees to a large extent cushions the employer against claims from the employees as a result a work related injury or illness.

Only 25% of the respondents stated that 4% of their companies' budget was allocated for Safety and Health training and capacity building. Another 25% had 20% of their budget allocated for this purpose, 12.5% and 37.5% of the respondents stated that 25% and 30% respectively had been allocated for this purpose. Allocation of funds was based on various reasons. While Vestas based their budgetary allocation on the risks assessed based on the different tasks, the other members of the site management teams seemed not to be aware of the reasons behind such allocation.

All the respondents were however of the opinion that the funds allocated to Safety and Health was not adequate. Lack of management involving them in budget allocation decision was the key hindrance for adequacy in allocating financial resources. Blanket allocation of the funds based on the contract and not the individual company's risk management controls was identified as another problem. The sub-contractors were keener to work within the confines of their contracts than to identify the specific risk controls that are required for their employees' Safety and Health. Generally, the workforce and the middle and some senior managers were not involve in allocating the budget for Safety and Health Management.

The OSHMS was not referred to during these allocations. As such, during the implementation of the project, managers noted the inconsistency and inadequacy of funds allocated to various controls such as the PPE, Safety award programs and Safety equipment. Programs such as the health surveys that were clearly indicated on the OSHMS manual was not conducted during the duration of the project. The incumbent middle management team that were to receive further Safety and Health training in the Vestas global training centers were not given this opportunity due to this same reason. A lack of budgetary planning for the allocation of funds within the various Safety and Health management programs prior to the start of the project created an avenue to shift funds to other needs such as hiring of more personnel and frequent transportation of top management to and from the project area which had not been in the project inception plan. This further reduced the funds available for Safety and Health.

4.6 Research Hypothesis Testing Results

In order to choose between two competing hypothesis, the researcher applied the Chi-square two tailed test on the hypothesis that were earlier stated (See subsection 2.7). Chi-square two tailed test was thought by the researcher to be ideal as this tests for the degree of association between two relating variables.

Hypothesis 1:

H_o: There is no significant relationship between employee's education level and the employee's participation in OSHMS implementation.

Statistical code	Education Level	Frequency	Percent
1	Masters	2	1.4%
2	Bachelors	11	7.7%
3	College	45	31.5%
4	Secondary	71	49.7%
5	Primary	10	7.0%
6	No education	4	2.8%
	Total	**143**	**100.0%**

Table 4:15 Frequency table on the employee's level of education

Forty nine (49%) of the respondents stated that Secondary education was their highest level of education. Only 2.8% had no received no formal education while the 1.4% had achieved the master's level of education representing 2 respondents.

Relationship between level of education and employee participation in Safety and Health management.		
	χ^2	**P Value**
Education and employee participation in Safety and Health management.	2.289	0.765

Table 4:16 Chi-square test of independence between level of education and employee participation in Safety and Health management.

The table 4:16 shows the results of testing hypothesis H_1. The P value was found to be 0.765 which is greater than 0.05 (95% level of significance). There is insufficient evidence to reject the null hypothesis. It can be concluded that is therefore no statistical significance between the employee's level of education and the employee's participation in Safety and Health management. The level of education does not influence whether or not the employee would participate in the company's health and safety management system implementation

Hypothesis 2:

H_o: There is no significant relationship between employee's work experience and the employee's participation in OSHMS implementation.

Code	Years of experience	Frequency	Percent
1	0-5 years	59	41.2%

Code	Years of experience	Frequency	Percent
2	5-10 years	44	30.8%
3	10-15 years	17	11.9%
4	15-20 years	5	3.5%
5	20-25 years	7	4.9%
6	25-30 years	4	2.8%
7	Above 30 years	7	4.9%
	Total	**143**	**100.0%**

Table 4:17 Frequency table on employee's years of job experience

The level of experience was divided into 9 clusters as represented in table 4.17. Looking at the table and chart above, most of the respondents stated that they have between 5-10years of experience.

Relationship between employee's job experience level and employee participation in Safety and Health management.		
	χ^2	**P Value**
Employee job experience and employee participation in Safety and Health management.	15.050	0.012

Table 4:18 Chi-square test of association between employee's job experience level and employee participation in Safety and Health management.

The *p* value was found to be 0.012 which is less than 0.05 (95% level of significance). There is sufficient evidence to reject the null hypothesis and accept the alternative hypothesis. In conclusion, it can be stated that there was found to be statistical significance in the relationship between the employees' job experience level and the employee's participation in Safety and Health management.

Hypothesis 3:

H_o: Additional training in OHS does not significantly result in the employee's participation in the OSHMS implementation.

Only 20% of the employees have not received any additional OHS training. Vestas strives to ensure that employees get equipped with additional OHS training in order to encourage and guide employee participation in the implementation and management of the implemented Safety and Health Management strategies.

Relationship between additional OHS training and employee participation in Safety and Health management.		
	χ^2	**P Value**
Additional OHS training and employee participation in Safety and Health management	1.012	0.387

Table 4:19 Chi-square test of independence between additional OHS training and employee participation in Safety and Health management.

P value was found to be 0.387 which is greater than 0.05 (95% level of significance) indicating that there is no sufficient evidence to reject the null hypothesis. There is therefore no statistical significance relationship between equipping the employees with additional OHS training and their participation in Safety and Health Management. Additional health and safety training offered to employees by the company does not influence whether or not they would participate in the OSHMS implementation.

CHAPTER 5 SUMMARY OF KEY FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This section summarizes the findings of the study briefly highlighting the key issues identified from the study. Additionally, the researcher proposes ways in which the company can bridge the gaps identified in order to ensure that the OSHMS is effectively implemented.

5.1 Key Findings

The implementation of any management system requires the active participation of the employees and management in order for the management system to be effective to achieve its objectives. For the employees to participate constructively, it is equally important that the employees are empowered through training, capacity building, provision of adequate and effective safety equipment and provision of a safe environment to interact with and air their Safety and Health issues to the management.

A person's capacity at work is a sum of his or her work experience, age, level of education, gender, and their cultural background. An employee's work experience has significant bearing on the implementation of Vestas Eastern Africa Ltd's OSHMS. The same cannot be said of the person's age, level of education, gender or their cultural background. Of significance is that their work experience influences significantly their ability to identify and report OHS issues or non-compliances, influences their involvement in OHS incidents and injuries, employee feeling of safety and their general participation in the implementation of the OSHMS. The cultural background only significantly influences how safe the employee feels which improves their involvement in the implementation of the OSHMS.

Improving the employee's capacity through training and provision of safety protection equipment improves the ability of the employee to identify and keep themselves from harm's way. However, the research showed that these alone does not influence the capacity of the employee to participate in the implementation of the OSHMS. Training in OHS however improved the employee's communication abilities in regards to OHS management, where more employees were see, to communicate OHS issues through mainly the Safety and Health management team and the site supervisors. Availing the personal protection equipment significantly makes the employee feel safe, and is associated with their involvement in OHS incidents. The management teams were seen to be keen on investing in improving employee

capacities in areas that were emphasized on the Vestas OHS Manual while overlooking other areas of interest.

Employee capacity building does not directly influence the OHS trends at Vestas Eastern Africa. Other factors such as supervision, OHS incentives, management commitment play a role in the occurrence of OHS incidents and the OHS overall level of compliance. Other incentives such as the SAZ award system that was introduced had a bigger effect in influencing the employee's willingness to participate in the implementation of the OSHMS through identification and reporting of hazardous observations and participation in OHS audits.

5.2 Conclusions

Involving employees in the implementation of the OHSMS is vital to ensure its success to achieve the company OHS objectives. Employees are more receptive to a new system if they are wholly involved in its development and in its implementation. They are more willing to voice their opinions and feelings in regards to the system and they will contribute to a large extent the key issues that are pertinent to them as far as the OHSMS is concerned. However, efforts to train the employees on health and safety should not only be boosted during employment they have little impact on the employees' opinion of the OHSMS. Health and safety training should be introduced to potential employees as they study their areas of specializations prior to seeking any form of employment. In this case, there is higher chances of the employees absorbing any additional health and safety training offered during the course of work.

5.3 Recommendations

5.3.1 Recommendations for Policy makers in government

A significant gap that was identified in the course of the research was the unavailability of a trade union for construction workers. In many countries, it was identified that these unions help workers to know their rights more through communication in the unions, and at the same time they are able to air their grievances freely with others that identify with them. In this case, it should be put as a requirement that all construction workers are to belong to these

unions or associations before they can be considered for employment. The different types of workers in this case, from the skilled to the unskilled, from the drivers, to the masons, to the carpenters will be considered. Those with the different levels of education and those without any formal education will also be considered. In this case, Safety and Health issues that affect them are raised through effective communication channels within their trade unions and positive change effected.

Mandatory Safety and Health training curriculum should be developed and effected to all construction workers regardless of their field of practice. Lack of basic OHS knowledge in executing their various tasks increases their proneness to OHS injuries and incidents, and reduces their likelihood to speak up in the even an employer, driver by production, puts them in harm's way. Additionally, as part of their curriculum, professional construction employees, as they undertake their professional courses, must have OHS as a key component to this training. Scholarship programs, for construction workers already engaged in different fields, should be offered as an incentive to drive the construction Safety and Health campaign. Construction managers and supervisors should also be encourage to participate in these trainings. Mandatory or voluntary approaches to the OHS training can be considered.

Stringent laws, with heavy penalties ought to be developed and effectively enforced in both Safety and Health Management and Construction Management. Laws regarding training and capacity building, provision of safe equipment, reporting of OHS incidents and illnesses, conducting risk assessments, should all be considered mandatory for all employers. Communication on these laws should then be passed on to all employees to empower them to be part of OHS management at their work places. DOHSS should get more enforcement officers on board who should be trained on OHS management legislature and they should be given powers to stop work that is carried out unsafely, and also powers to convict those liable without putting the enforcement officers in any danger.

5.3.2 Recommendations for OSH practitioners

To effectively implement a company's OSHMS, the OHS practitioners need to, consistently equip themselves with additional OHS training. Additional training will not only keep them at par with the changes in OHS locally, regionally and globally, such training will also give them tools which they can use to engage in management change programs, budgeting and planning, managing contractors effectively, and in this effect, implement OSHMS and other OHS strategies effectively. Such knowledge will also improve their confidence in addressing

Safety and Health training within various fields. Additionally, they can also be instrumental in the development and enforcement of OHS legislature and policies.

An avenue that has been tested within Vestas Eastern Africa is the introduction of an OHS award system which acts as a motivator to the employees, encouraging the employees to participate in OHS management within their various companies. Such programs may be recognition programs, bonus incentive programs or simply OHS token award programs. Either way, as was seen in Vestas eastern Africa, these incentive programs encourage the application of OHS knowledge gained in training onto the tasks they have been assigned to do. This has been seen to result in lower OHS injuries and incident rates, one of the objectives of the implementation of the OSHMS.

5.3.3 Recommendations for Vestas EA Ltd

Inadequate planning prior to the beginning of the project was seen as one of the main hindrance to effective planning and management. Planning and implementing actionable plans prior to the start of the project will ensure that adequate resources (financial and human resource) have been allocated towards the management of OHS within the project. This is especially since, most of the projects are completed within short periods of time (1-2 years). Inadequate planning wastes a lot of time resource in developing and correcting OHS strategies, while the employees work while exposed to OHS injuries and illnesses. Additionally, these OHS strategies should be customized to the target country, and population. Being an international company, many of the strategies that are detailed within the OSHMS are general to a large extent in order to accommodate the variations in social and environmental differences from one country to another. The disadvantage of such generalization is the fact that key areas that are important in the countries of interest in regards to OHS are often not identified until after the project has already commenced.

5.3.4 Recommendations for further research

Areas which require further research in order to streamline OHS management are as follows:

1. Safety and Health Committees.
    a) Challenges that companies Safety and Health committees face in the execution of their mandate
    b) Organizational challenges hinder the functioning of Safety and Health Committees

2. Participatory management review on OSHMS; gaps, trends, and opportunities
3. Significance of Safety and Health audits in OSHMS implementation; gaps, trends and opportunities
4. Under-reporting of Safety and Health incidents; causes, and solutions

REFERENCES

Abdullah, R., Karim N, Patah M. & Harnizam Z. (2009). *The linkage of employee satisfaction and loyalty in hotel industry in Klang Valley, Malaysia*. International Journal of Business and Management.

Adan, E. (2004). *Factors affecting Safety on Construction Projects*. Department of Civil Engineering, Palestine.

Amagoh F. (2008). *Perspectives on Organizational Change: Systems and Complexity Theories.* Retrieved from *The Innovation Journal: The Public Sector Innovation Journal*, Volume 13(3), 2008, article 3, Kazakhstan Institute of Management, Kazakhstan.

AS/NZS 4801:2001 (2001). Occupational Safety and Health Management Systems. Standards Australia International, Sydney-Australia and Standards, New Zealand, Wellington-New Zealand.

Auyong H. (2015). *Safety Culture in Malaysian Workplace*. Penang, Malaysia.

Bakri A., Mohamed R., Misnan M. & Mohamed M. (2006). *Occupational Safety and Health (OSH) Management Systems: Towards development of a healthy and safe culture.* Kuala Lumpur, Malyaisia.

Ballantyne, C. (2003). *Measuring quality units: considerations in choosing mandatory questions. Paper presented at the Evaluations and Assessment Conference: A Commitment to Quality*. University of South Australia, Adelaide.

Belin A., Zamparutti T., Tull K. & Hernandez G. (2011). *Occupational Safety and Health Risks for Most Vulnerable Workers.* Milieu Ltd. European parliament, Brussels.

Brijlall M. (2015). *An Analysis of Employee Participation in Occupational Safety and Health Activities in A Cement Manufacturing Organization In South Africa.* University of South Africa. South Africa.

Brink H. (1993). *Validity and Reliability in Qualitative Research*. Conference paper delivered at SA Society of Nurse Researchers' Workshop. RAU

Bureau of Labour Statistics, (2000). Current Labour Statistics. The Unites States.

Caithness Windfarm Information Forum, (CWIF) 2018. Summary of Wind Turbine Accident data to 31 March 2018. www.caithnesswindfarms.co.uk. Accessed on 24th May 2018.

Chen M. (2003). *Workers' Participation and Their Safety and Health Protection in China's Transitional Industrial Economy.*

Cook, C., Heath F. & Thompson R. (2000). *A meta-analysis of response rates in web or internet-based surveys*. Educational and Psychological Measurement Journal.

Damasah S. (2016). *Challenges in the Informal Construction Artisan Training System in the Ghanaian Construction Industry.* Kumasi, Ghana.

Diugwu I. *& Baba L.* (2012). *Effective regulation and level of awareness: An expose of Nigeria's construction industry*. Journal of Safety Science and technology.

Dommeyer, C. 2004. *Gathering faculty teaching evaluations by in-class and online surveys: their effects on response rates and evaluations*. Assessment & Evaluation in Higher Education.

Eisner, H. & Leger J. (1988) *The International Safety Rating System in South African Mining*. Journal of Occupational Accidents. Pages 141-160.

ElSafty A., ElSafty A & Malek M. (2012). *Construction Safety and Occupational Health Education in Egypt, the EU, and US Firms.* Published on Open Journal of Civil engineering, Scientific Research. Pages 174-182

EU-OSHA, (2012). *Worker Participation in Occupational Safety and Health. A Practical Guide*. European Agency for Safety and Health at Work.

EU-OSHA, (2013). *Green jobs and occupational safety and health: Foresight on new and emerging risks associated with new technologies by 2020, 2013*. EU-OSHA.

European Agency for Safety and Health at Work. (2002). *Priorities for occupational safety and health research in the EU-25.* Luxembourg

European Agency for Safety and Health at Work. (2013). *Occupational safety and health in the wind energy sector.* Retrieved from the journal, European Risk Observatory Report.

Evaluation (2008). *Data Collection Methods for Program Evaluation: Observation*. Department of Health and Human Services, Centre for disease control. Journal of Evaluation briefs No. 16.

Frick, K., Wilthagen A., Jensen P. & Quinlan M. (2000) *Systematic Occupational Safety and Health Management – All Introduction to a New Strategy for Occupational Safety, Health and Well-being*. Amsterdam, Netherlands.

Gaceri K. (2015). Factors Affecting the Implementation of Safety and Health in Supermarkets in Kenya. International Journal of Human Resource Studies. Macrothink Institute.

Gachie C. (2011). *Relationship between Human Resource Policies and Employees Job Satisfaction in a Local Non-Governmental Organization in Kenya: A Case of Article 19 Kenya*. Nairobi, Kenya.

Gagliardi D., Marinacci A., Valenti A & Iavicoli S.. (2011). *Occupational Safety and Health in Europe: Lessons from the Past, Challenges and Opportunities for the Future.* Monteporzio Catone (Rome), Italy

Gallagher C., Underhill E. & Rimmer M. (2001). *Occupational Safety and Health Management Systems: A Review of their Effectiveness in Securing Healthy and Safe Workplaces*; Commonwealth of Australia

Ghahramani A. (2016). *Assessment of Occupational Safety and Health Management Systems Status and Effectiveness in Manufacturing Industry.* Helsinki, Finland.

Global Wind Energy Council. (2014). From the journal *Global Wing Energy Outlook, 2014*.

Goh S., Elliott C., & Quon T. (2012). *The relationship between learning capability and organizational performance: A meta-analytic examination.* University of Ottawa, Ottawa, Canada.

GoK (2007). *Occupational Safety and Health Act, 2007.* Government Press. Nairobi, Kenya.

GoK (2007). *Worker Injury Benefit Act, 2007.* Government Press. Nairobi, Kenya.

GoK (2011). *DOSHS Annual Report, 2011*

GoK (2012). The National Occupational Safety and Health Policy. Government Press. Nairobi, Kenya

GoK, (2012). *Kenya Nursing Workforce Report. The Status of Nursing in Kenya*. The Ministry of Health, GoK.

GoK. (2005).*The Factories and Other places of Work (Medical examination rules), 2005*. Government Press. Nairobi, Kenya

GoK. (2005).*The Factories and Other Places of Work (Noise Prevention and Control) Rules 2005*. Government Press. Nairobi, Kenya

GoK. (2010). *Occupational Safety and Health Act Bill, 2010*. Government Press. Nairobi, Kenya.

Golafshani, N. (2003). *Understanding Reliability and Validity in Qualitative Research-The qualitative Report.* Toronto, USA.

Guastello, S. (1991). S*ome further evaluations of the International Safety Rating System*. Safety Science Journal.

Gunningham, N. (2008) *Occupation Safety and Health, Worker Participation and the Mining Industry*. Changing World of Work. Economic and Industrial Democracy, Journal.

Hamalainen N., Takala J & Kiat T. (2017). *Global Estimates of Occupational Accidents and Work-Related Illnesses 2017*. Workplace Safety and Health Institute. Singapore.

Harris L., Walker R & Olsen K., 2011; *Employee participation and the role of Safety and Health representatives: Legislation, literature and role enactment.* School of Management, Massey University, Palmerston North, New Zealand

Health and Safety Executive. (2010). *Safety and Health in the New Energy Economy: Meeting the challenge of Major change*.

Helmer M. & Altstadt D. (2013). *Apprenticeship: Completion and Cancellation in the Building Trades.* The Aspen Institute, USA.

Heylighen F & Joslyn C. (ed). *What is Systems Theory?* Retrieved from http://pespmc1.vub.ac.be/systheor.html ; Accessed on 03rd August 2015.

Hogstedt C. & Pieris B. (2000). *Occupational Safety and Health in Developing Countries: Review of strategies, case studies and a bibliography.* Arbetslivsrapport, National Institute for Working life.

HSE Research Report 367. (2005). *'A Review of Safety Culture and Safety Climate Literature for the Development of the Safety Culture Inspection Toolkit'.*

ILO (2005). Baseline Study on Labour Practice on Large Construction Sites in the United Republic of Tanzania, Working paper 225, Geneva: International Labour Office.

ILO-OSH (2001).*Guidelines on Occupational Safety and Health Management Systems, ILO-OSH 2001*. (Ed. 2009). Geneva, Switzerland.

Jilcha K & Kittaw D (2016). *A Literature Review on Global Occupational Safety and Health Practice & Accidents Severity.* International Journal for Quality Research.

Kaguathi J. (2013). Challenges of Implementing Occupational Safety and Health Strategies at East Africa Portland Cement Company Limited, Kenya. University of Nairobi, Kenya.

Kemei R., Kaluli J. & Kabubo C., (2014). *Assessment of Occupational Safety and Health in Construction Sites in Nairobi County, Kenya.* Jomo Kenyatta University of Agriculture and Technology. Juja, Kenya.

Khan W. (2014). *Occupational Health, Safety and Risk Analysis.* International Journal of Science, Environment. Volume 3.

Kibe K. (2016). Assessment of Safety and Health Management on Construction sites in Kenya: A Case of Construction Projects in Nairobi County. Jomo Kenyatta University of Agriculture and Technology. Nairobi, Kenya

LTWP (2014): *Community Safety and Health Management Plan.*

LTWP ESIA, (2007). *Environment and Social Impact Assessment Project report.*

Machida, S. (2009). *Accident prevention-a safe workplace.* African Newsletter Occupational Safety and Health.

Marshall M. (1996). *Sampling for qualitative research*. Oxford University Press. Great Britain

Marwowski W. (Ed.) (2001). *International Encyclopedia of Ergonomics and Human Factors.* Taylor & Francis. London, England.

Morgan D. (1996). *Focus Groups*. Portland State University. Portland, Oregon.

Mosher A. (2011). *Measurement and analysis of the relationship between employee perceptions and safety and quality decision making in the country grain elevator*. Iowa State University, Ames-Iowa.

Mundy D. (Ed), (2002). *A Question of Response Rate.* Solution Corner journal.

Mutemi, D, (2007). *A survey of the Occupational Safety and Health Programmes Adopted by Chemical Manufacturing firms in Nairobi.* University of Nairobi. Kenya.

National Construction Authority, (2012). *Capacity Status Report in Skills, Equipment, Materials and Financing. Construction Industry Capacity Survey-July, 2014*. The National Construction Authority.

National Profile on Occupational Safety and Health, ILO, 2013

NOHSC, (2001). *Occupational Safety and Health Management Systems: A Review of Their Effectiveness in Securing Healthy and Safe Workplaces*.

Nulty D. (2008). *The adequacy of response rates to online and paper surveys: what can be done?* Assessment & Evaluation in Higher Education. Taylor and Francis group, Australia.

Omran A., Hassan M., Bakar A. & Sen H. (2008). *The implementation of OHSAS 18001 in construction industry in Malaysia.* Journal of Engineering TOME VI (year 2008). Pages 157-162

Onyoyo H. Mbakaya C., Lwaki S. & Omondi OJ. (1998). *A survey of management perspectives of the state of workplace Safety and Health practices in Kenya*. Journal for Accident Analysis and Prevention. Page 305-312

OSHA, (1970). United Sates Government. *Occupational Safety and Health Act of 1970.*

Pearse W., Gallagher C & Bluff L. (Ed), (2001). *Occupational Safety and Health Management Systems: Proceedings of the First National Conference*. Sydney, Australia.

Pearson K. (2009). *The causes and incidence of occupational accidents and ill-health across the globe*. British Safety Council.

Powell A. (2018). *Apprenticeship Statistics: England.* House of Commons Library, UK.

Puplampu B. & Quartey S., (2012). *Key Issues on Occupational Safety and Health Practices in Ghana: A Review*. Accra – Ghana, West Africa

Radvanska A. (2010). *Accident Losses Elimination by Means of Safety Pyramid Analysis*. Technical University of Kosice. Kosice, Slovakia.

Redinger C. & Levine S. (1998). *Development and Evaluation of the Michigan Occupational Safety and Health Management System Assessment Instrument: A universal OSHMS Performance Measurement tool.* American Industrial Hygiene Association Journal; Vol. 59. Pages 572-581

Renewables. (2014). *Global Status Report*

Retrieved from journal *The Open Construction and Building Technology*. (2008). Bentham

Robson L. (2006). *Occupational Safety and Health Management Audit Instruments: A Literature review*. Institute for Work and Health. Toronto

Robson L., Clarke J, Cullen K, Bielecky A, Severin C *et al* (2005). *The Effectiveness of Occupational Safety and Health Management Systems: A Systematic Review.* Institute for Work and Health. Toronto, Ontario.

Sang D. & Powell A. (2012). *Gender inequality in the construction industry: Lessons from Pierre Bourdieu*. Edinburgh, UK, Association of Researchers in Construction Management.

Tan C., Hashim F. & Liang C. (2015). *Occupational Safety and Health Advisory Services (OHSAS) 18001 Management System Adoption: Assessing the Determinants.* Journal Pengurusan

Taylor M., McNicholas C., Nicolay C., Darzi A., Bell D. & Reed J. (2013). *Systematic review of the application of the plan–do–study–act method to improve quality in healthcare.* North-West London, London, UK.

Thakur N. (2014). Worker Participation in Management Decision Making Within Selected Establishments in Uttar Pradesh, India. Retrieved from the *Annual Research Journal of Symbiosis Centre for Management Studies*. Pune.

The *Daily Nation, May 14th, 2017.*

The Daily Nation, October 6th, 2015.

The Institute of Engineering and technology-IET. (2017). *Safety culture*. Safety and Health Briefing No. 07. Wales, United Kingdom

United States Census Bureau (2000). Census 2000 Profile. U.S Department of commerce. The United States.

Vecchio-Sadus A. (2007). *Enhancing Safety Culture through Effective Communication*. CSIRO Process Science and Engineering. Clayton South VIC, Australia

Vestas (2016). Vestas Occupational Health, Safety & Environment Manual. Live document.

Vincent J. (2004). *Analysis of Construction Industry Apprenticeship Programs in Indiana.* Indiana University Institute for the study of labour in Society. Indiana, USA.

Watt S., Simpson C., McKillop C., & Nunn V. (2002). *Electronic course surveys: does automating feedback and reporting give better results?* Assessment & Evaluation in Higher Education journal. Pages 325-337.

White Paper (2012 January). Journal on injury and illness prevention programs

Xue C., Lijun T. & David W (2017). *Who is dominant? Occupational Safety and Health management in Chinese shipping*. Journal of Industrial Relations

Yamane, T. (1967). *Statistics, an Introductory Analysis (Ed).* Harper and Row, New York.

Yin R. (2009). *Applications of Case Study Research (Ed).* Sage Publications Inc. Washington DC, USA.

Zainal Z. (2007). *Case Study as a research method; Faculty of Management and Human Resource Development*. Universiti Teknologi, Malaysia.

Zimmerman, D., (2005). "*Is OSHA Important?*" Employee Relations Law Journal.

Zungu, L. & Setswe K., (2007). "*An integrated approach to the prevention and promotion of health in the workplace: a review from international experience: open forum*", South African Family Practice Journal. Pages 6-9.

ANNEX I. Definition of Terms

Accident	An event that was not planned but that which resulted in harm to persons or caused loss or damage to property.
Compensation claim	A claim filed on behalf on injured person as directed by the Worker Injury Benefit Act or any other insurance policy that protects the workers against injury or loss that can be proved to be as a result of activities directly linked to work.
Competence	The sum of a person's training, skills, experience, knowledge and personality that gives them ability to effectively perform a given task.
Hazard	The potential to cause harm to a person or to the environment or to property of any equipment, material, process or machine.
Safety and Health Incident	An unexpected and undesired event which did or could have resulted in harm to persons or damage to property or the environment.
Safety and Health Induction	A brief introduction to a company's health and safety policy that is given to new employees, or visitors before they can be allowed to access the workplace as a means to reduce the risks to them.
Occupational Safety and Health	The total wellness of workers at a particular workplace managed through the development and promotion of healthy and safe practices to shield the workers from harm as far as reasonably possible.
Occupational Safety and Health Management System (OSHMS)	An organized and integrated set of organizational elements aimed at ensuring the effective management of occupational hazards at the workplace. These elements are continuously reviewed and improved.
Occupational Illness	A sickness or reduction in health of a person whose source can be directly traced to biological, chemical or physical conditions at the workplace.
Organizational culture	The sum of personalities, attitudes, behavior, beliefs and values shared by workers within a workplace which results in assumptions of how persons at the workplace should interact and behave.
Risk	The likelihood of a worker suffering harm or property to be damaged

	as a result to exposure to particular workplace hazards.
Scaffolding	Temporary structure erected in order to support workers to comfortably work on heights from which they can fall and be harmed.
Toolbox Talks	Briefs shared prior to the start of work which is a means to share specific workplace hazards management with the workers in order to reduce the risk of the workers being exposed to workplace hazards.
Works at Height	Work that is above ground level from which if a person falls physical injury can be inflicted.

ANNEX II. Employee Survey Questionnaire

I am a student at the University of Nairobi, undertaking M.A Environmental Planning and Management. As part of my studies I am required to undertake research in my area of interest. The research purpose is to assess the level of employee awareness of the Occupational Safety and Health strategies within Vestas Eastern Africa Ltd. Information collected will be used for academic purposes only. Identity of the respondent and their answers will remain anonymous and strictly confidential.

SECTION A: PERSONAL INFORMATION (Tick (√) where appropriate)

1) Name …….…….
2) Company
   - ☐ Vestas
   - ☐ Bollore
   - ☐ EGMF
   - ☐ Anipsotiki

   Other (Please Specify) ……..
3) Nationality…….....
4) If Kenyan, please state the place of origin……
   Mobile phone No (Optional) ……..
5) Gender
   - ☐ Male
   - ☐ Female
6) How old are you? …….
7) Occupation of the respondent
   - ☐ Metal worker
   - ☐ Carpenter
   - ☐ Cleaner
   - ☐ Housekeeping
   - ☐ Kitchen
   - ☐ Installation
   - ☐ Steel fitter
   - ☐ Other (Please Specify) …….
   - ☐ Heavy machinery Operator
   - ☐ Driver
   - ☐ Electrician
   - ☐ Supervisor
   - ☐ Manager
   - ☐ Administrator
8) Which of the below best describes your terms of employment?
   - ☐ Full-time employee
   - ☐ Contract employee
   - ☐ Temporary/Casual employee
9) State your highest level of education
   - ☐ PhD
   - ☐ Masters
   - ☐ Bachelors
   - ☐ College (Certificate)
   - ☐ Secondary
   - ☐ Primary
   - ☐ No education
10) How many years of experience do you have?
    - ☐ <1 year
    - ☐ 1-2 years
    - ☐ 3-5 years
    - ☐ 5-10 years
    - ☐ 10-15years
    - ☐ 15-20 years
    - ☐ 20-25 years
    - ☐ 25-30 years
    - ☐ Above 30 years
11) Have you had any training on the work that you are tasked to do?
    - ☐ Yes
    - ☐ No
12) If YES, what form of training?

- ☐ Diploma course
- ☐ Degree course
- ☐ Post-Secondary certificate course
- ☐ On-job training (Apprenticeship)

13) Was occupational Safety and Health part of your training course?
    - ☐ Yes
    - ☐ No
14) Please select what other safety related training you have had from the list below (select more than one if as applicable).
    - ☐ Fire Fighting
    - ☐ First Aid
    - ☐ Waste Management
    - ☐ Hazard identification
    - ☐ Safety and Health Committee
    - ☐ Work At Height
    - ☐ Height Rescue
    - ☐ Scaffolding
    - ☐ Disaster Management
    - ☐ Hazardous material Management
    - ☐ Lifting equipment inspection
    - ☐ Manual Handling

SECTION B: Safety and Health Policy

15) Was the Vestas Safety and Health Policy Statement Communicated to you?
    - ☐ Yes
    - ☐ No
16) If so, how was it communicated to you (Select more than one if applicable)?
    - ☐ Toolbox talk
    - ☐ Induction
    - ☐ Display on the notice board
17) Do you give actively participate in the OSHMS implementation?
    - ☐ Yes
    - ☐ No
18) How do you give feedback on Safety and Health issues (Select more than one as applicable)?
    - ☐ Through the supervisor
    - ☐ Through Anonymous report forms
    - ☐ Through Safety and Health Committee
    - ☐ Through Site management
    - ☐ Through the Safety and Health management
19) Do you receive feedback on how your Safety and Health concerns have been addressed?
    - ☐ Yes
    - ☐ No
20) Are you satisfied with how your Safety and Health concerns are addressed?
    - ☐ Yes
    - ☐ No
21) Does your company provide you with your Personal Protection Equipment?
    - ☐ Yes
    - ☐ No
22) How often is your PPE replaced?
    - ☐ Weekly
    - ☐ Monthly
    - ☐ Annually
    - ☐ Never

- Whenever required

23) Is the PPE that is provided adequate for the task assigned to you?
- Yes
- No

SECTION C: Safety and Health Communication

24) How would you categorize the amount of information on safety and health that you receive from your employer?
- Too much
- Enough
- Not enough

25) Are you aware of the company's incident reporting and recording system?
- Yes
- No

26) Have you been involved in any Safety and Health Incident?
- Yes
- No

27) How does your company communicate Safety and Health issues to you (Select more than one as applicable)?
- Through my supervisor
- Displayed on Notice Board
- Toolbox talks
- Electronic mail
- Trainings
- Other meetings
- All the above
- We don't receive any Safety and Health Communication

SECTION D: Responsibilities in Safety and Health

28) To whom do you report your Safety and Health concerns (select more than one as applicable)?
- Supervisor
- Team leader
- Safety and Health Officer
- Site management

29) How often does your company have toolbox talks meetings?
- Daily
- Weekly
- Monthly
- Never

30) Is it mandatory to attend the toolbox talks?
- Yes
- No

31) Which of these roles do you play in your company (select more than one as applicable)?
- First Aider
- Fire fighter
- Safety and Health committee
- Safety and Health representative
- None

SECTION E: Safety and Health Monitoring and Review

32) Generally, how safe do you feel in your workplace?

- ☐ Very Safe
- ☐ Safe
- ☐ unsafe
- ☐ Very Unsafe

33) How does your company involve you in reviewing the Safety and Health Management strategies currently in place (Select more than one as appropriate)?

- ☐ Anonymous reporting
- ☐ Safety and Health surveys
- ☐ Feedback through the Safety and Health committee

SECTION F: Safety and Health Awareness and Training

34) Did you receive Safety and Health Induction or Training before you started working at your current workplace?

- ☐ Yes
- ☐ No

35) Have you received any additional Safety and Health training other than the safety and health induction?

- ☐ Yes
- ☐ No

36) Does your company have written policies on any of the following (Select more than one as applicable)?

- ☐ Safety and Health Policy
- ☐ Alcohol and Drug Abuse Policy
- ☐ Land Transport Policy
- ☐ Smoking Policy
- ☐ All the above
- ☐ No written policies are available
- ☐ Other (Please Specify)……...

37) Please rank the following according to what you consider most important in making decisions at your workplace (1=Most Important, 2=Very Important, 3=Important, 4=Least Important, 5=Not Important)

NB: Please indicate numbers 1,2,3,4 or 5 in each item. Do not repeat any of the numbers.

	Most Important	Very Important	Important	Least Important	Not Important
My Religion					
My cultural norms (tribe/race)					
My Safety and Health					
My work experience					
My education/training					

ANNEX III. Management Interview Questionnaire

To Whom It May Concern

I am a student at the University of Nairobi, undertaking M.A Environmental Planning and Management. As part of my studies I am required to undertake research in my area of interest. The research purpose is to evaluate employee capacity in line with effective Occupational Safety and Health Management System implementation within Vestas Eastern Africa Ltd. Information collected will be used for academic purposes only. Identity of the respondent and their answers will remain anonymous and strictly confidential.

Self-Assessment Checklist

POLICY

	YES	NO
There is a written signed and dated safety and health policy that has been communicated to the employees.		
2. Do the directors regard health and safety as an integral part of the business?		
3. Are the directors committed to continually improve safety and health management?		
4. Is there a named director or senior manager that has the overall responsibility over the safety and health policy?		
5. Does the company safety and health policy commit the directors to review and continually improve health and safety management plans? Our policy commits the Directors to preparing regular Safety and Health improvement plans and regularly reviewing the operation of our Safety and Health policy?		
6. Does the company policy encourage the participation of employees in managing safety and health?		
7. Does the company policy commit to ensure that employees are competent in the work they are assigned?		

ORGANISING - CONTROL

	YES	NO
1. Have the responsibilities of all the managers, supervisors and team leaders been defined in terms of health and safety?		
2. Do the managers accept and commit to fulfilling their health and safety responsibilities and have adequate time and resources?		
3. Are the supervisors, managers, and team leaders aware that they are obliged to fulfil their safety and health duties and that they will be held accountable?		
4. Have you identified persons that are responsible for safety and health that require special training and expertise?		

ORGANISING – COMPETENCE

	YES	NO
1. Have the knowledge experience and skills of the employees to carry out work safely been assessed?		
2. Is there a system within the company that assesses and monitors the adequacy of training of all managers, team leaders and supervisors?		

3. Do you have a system that ensures that persons assigned to specialized hazardous tasks have the necessary competence to carry out the tasks safely?		
4. When you need specialist advice in safety and health, are there arrangements to acquire it?		
5. Is there a system that ensures that competence needs are identified and met in the event new employees are taken in, transferred or promoted?		

ORGANISING – COOPERATION

	YES	**NO**
1. Do your management consult with your employees and health and safety representatives on safety and health matters?		
2. Do you have a safety and health committee consisting of both employees and management as required by the law?		
3. Are the employees involved in the development of safety and health management plans, safety and health performance reviews, safety and health incidents investigation and undertaking the workplace risk assessments?		
4. Are there arrangements for coordinating with the contractors and other stakeholders at the workplace to ensure safety and health is wholesomely managed?		

ORGANISING – COMMUNICATION

	YES	**NO**
1. Is safety and health regularly discussed in management meetings?		
2. Is clear information about hazards and risks and risks control measures provided according to their relevancy to the tasks?		
3. Are the directors approachable and open to discuss safety and health issues with their staff?		
4. Do the directors, supervisors, managers and team leaders show their commitment through following the safety and health rules themselves?		

PLANNING AND IMPLEMENTING (Consider Financial, Human, Time Resources)

	YES	**NO**
1. Is there a system in the company for identifying new hazards, assessing risks and selecting methods to manage them?		
2. Is there a system for planning, scheduling and prioritizing for safety and health improvement measures?		
3. Are there arrangements in place for discussing and agreeing on safety and health improvement measures with the employees?		
4. Are there arrangements that put safety and health into account during purchasing and implementation of plants, equipment and materials?		
5. During the design of processes, procedures, plants, equipment and tasks, are safety and health measures put into account?		
6. Are there safety and health rules that guide the implementation of risk management measures for normal day to day foreseeable and unforeseeable activities?		

7. Are there any arrangements that guide in dealing with serious and imminent dangers and emergencies?		
8. Are there standards against which safety and health performance is measured?		

MEASURING PERFORMANCE

	YES	**NO**
1. Are there any arrangements in place for monitoring the progress implementation of safety and health management plans and objectives?		
2. Do you actively monitor whether current safety and health control measures are working to achieve the set standards?		
3. Are there arrangements for reporting and investigating safety and health incidents, near misses and hazardous situations?		
4. If the arrangements in 2 and 3 indicate that the controls are defective, is there a system to identify reasons for the defects?		
5. Is there a system which can manage and prioritize situations which resulted in specific serious risks?		
6. We have arrangements for analyzing the causes of any potentially serious events so as to identify the underlying root causes including causes arising from shortcomings in our safety management system and safety culture.		

AUDIT AND REVIEW – LEARNING FROM EXPERIENCE

	YES	**NO**
1. We have regular audits of our safety management system carried out by competent external auditors or competent auditors employed by our company who are independent of the department they are auditing?		
2. We use the information from performance monitoring and audits to review the operation of our safety management system and our safety performance?		
3. We regularly review how well we have met the objectives in our Safety and Health improvement plans and whether we have met them in the agreed timescales?		
4. We analyze the information from performance measurement and use it to identify future improvement targets and to identify particular causes of accident, ill health or poor control of risk to target for future risk reduction effort.		
5. We benchmark the performance of our safety management system against that of other businesses in the same industrial sector and/or to monitor our own overall improvement over time?		

ANNEX IV. Focus Group Discussion Guide

FOCUS GROUP DISCUSSION GUIDE	
Focus Group Discussion No:_____ **Date:_____** **Start Time: _____** **Meeting Location: _____** **End Time: _____** **Moderator: _____** **Time Keeper: _____**	**No. of participants Scheduled: _____** **No. of participants attended: _____** **No. of male: _____** **No. of female: _____**
Greetings, Welcome to this Group Discussion meant to give feedback on the implementation of Vestas OHS management system. Confidentiality is key in our discussions and no names will be divulged in the report that will be developed. We will have the discussions running for approximately one hour. Before we begin kindly introduce yourselves and state your responsibility at your organization.	
Question 1: What do you understand with the term 'Safety and Health Management'? Who manages Safety and Health in your organization?	
Question 2: In which areas are you involved in the management of Safety and Health in your organization?	
Question 3: What is the influence of your capacity to at work on your participation in managing Safety and Health at site? (explain employee capacity)	
Question 4: In your opinion, what would you need in order to get more involved in managing Safety and Health in your organization?	

Question 5: If you are equipped with what was stated in question 4 above, does your chance of being involved in an incident increase or decrease? Why?   What other changes would you see if you are equipped with that was stated in question 4 above?

ANNEX V. Observation Schedule

OBSERVATION SCHEDULE			
Company code:_____ **Date of observation:**_____ **Time of observation:**_____ **Activity/Task:**_____ **Key: O**-Observed; **NO**-Not Observed; **OBNC:** Observed but not consistent			
Area of concern	**O**	**NO**	**OBNC**
OHS Supervision			
OHS Supervision by HSE management			
OHS Supervision by Site Supervisors			
OHS Supervision by Employees themselves			
OHS Communication			
OHS communication tools used			
Hazard identification by employees			
Hazard communication to other employees			
Hazard communication to site supervisors			
Incident communication to other employees			
Incident communication to site supervisors			
Task Management			
Task Safety Procedures known			
Tasks supervised			
Task Safety Procedures implemented by employee			
Proficiency on the task assigned			
Personal Protection Equipment			
PPE availed to employees			
PPE used by employees			
PPE used appropriately			
Safe use of tools			
Right tools availed to the employees			
Right tools used for right task			
Safe tools available			
Tools kept appropriately when not in use			
Housekeeping			
Items arranged appropriately near task			

Employees arrange inappropriately placed tools			
Supervisors arrange inappropriately placed tools			
Employees aware of where tools are located			
OHS Training			
Toolbox talks conducted			
Toolbox talks topic relevant to tasks			
Employee attendance mandatory on Toolbox talks			
Safe Task Instructions offered before tasks			
Safe Task Instructions relevant to tasks			
Task instructions include safety on task			

ANNEX VI. Face to Face Interview: Letter of Introduction

OCHIENG CYNTHIA ACHIENG

P.O. BOX 956-00200,

NAIROBI

TEL: +254723537340

EMAIL: caochieng10@gmail.com

Dear _____

I am currently a student at The University of Nairobi undertaking an M.A course in Environmental Planning and Management. My thesis is titled "***Implementing Occupational Health and Safety Management Systems: An Analysis of Employee Capacity Gaps at a Wind Energy Establishment in Kenya'***

In order to facilitate my completion of the thesis, I request a meeting with you in order to understand your role in your company as far as Occupational Safety and Health Management is concerned and any gaps or improvement areas that you may have identified.

Kindly let me know, through the above contacts, the most suitable time between **March 16th 2017 and March 31st** 2017 to have the brief discussion with you.

Please note that the discussion purely for educational purposes and any information I acquire will be treated with utmost discretion.

Yours Faithfully,

Cynthia Achieng Ochieng