

**AN EVALUATION OF WORKERS WELFARE
FACILITIES AND ITS EFFECTS ON PRODUCTIVITY
IN THE ZAMBIAN CONSTRUCTION INDUSTRY**

BY

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**A DISSERTATION SUBMITTED TO THE UNIVERSITY OF ZAMBIA IN
PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF
MASTER OF ENGINEERING DEGREE IN CONSTRUCTION MANAGEMENT**

The University of Zambia

Lusaka

2016

Declaration of Authorship

I, **Chisumbe Sampa** hereby declare that this work is my own, and that to the best of my knowledge, it has never been produced or submitted before at this university or any other institution for academic purposes, and that all sources of information have been duly acknowledged.

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Dedication

This dissertation is dedicated to my family who have sacrificed and waited patiently for me to get my Master of Engineering degree. Thanks a lot, you are such a blessing, this is for you.

Dad and mum, your entire support and guidance in my life is awesome and I owe you more than this piece of work. I cannot forget the sacrifice you made for my sake and the care you always give me is exceedingly great. It's a privilege to share lots of love with you and I still remember the educative wise words you told me in my tender age. Those remarkable words continue to encourage and motivate me knowing that I can do all things through Christ who strengthen me.

To God almighty, nothing would have been possible without you. You are the God who is there for me, this is awesome, my Jesus I love you so much, thank you Holy Spirit while!!!

Acknowledgments

Firstly, I acknowledge my awesome God Jehovah, for the blessings and prosperity he continues to bless me with. He has made this piece of work a success and definitely this thesis will remain an accolade of success granted to me from above.

My brothers and sisters; Mr & Mrs Cornelius and Elizabeth Chisumbe, Fr Bavu, Chama, Mumba, Ethel, Chanda, Chali Lyamibaba and Emmanuel (son/nephew).

Thank you very much for your support, you are too dear to me. I hold you at heart, thanks for all the unfailing support you give through and through in all aspects of life. Your love makes me have something to live for. Love you forever!!

Eneless Manda - Thank you for your love, patience, encouragements and belief. You are a blessing and your presence has added colour to my life.

My supervisor (Dr Erastus Mishengu Mwanaumo) – Thank you a lot for the inspiration and being there for me always, you gave me enough reasons for pursuing this route. Your patience and confidence helped in shaping this work. Your guidance throughout has been awesome sincerely meant to bring out the best out of me. Thank you very much for mentoring me into an expert, I am grateful.

School of Engineering - To the members of staff school of engineering I am thankful for the knowledge and inspiration. My classmate; Brudel Chipulu, Teddy Sinkolongo, Sundie Silwimba, Gabriel, Ngoza Muchimba, Sumbi, Micheal Chileshe, Mulenga, Mary Nyawa and Raphael Simbeye. Thank you for the friendship, love and support you guys are the best.

Mr & Mrs Kapya - You made my studies manageable, May God Almighty Bless and reward your generosity.

Abstract

Employees play an important role in the industrial production of the country. Therefore, ensuring employees' wellbeing through provision of welfare facilities is essential in stimulating desired conduct and performance. However, the Zambian construction industry is associated with numerous challenges in the provision of workers' welfare facilities on work sites. This research adopted a mixed approach with both probabilistic stratified random as well as non-probabilistic purposive sampling used to sample the population. A structured questionnaire and interviews were administered to the site management personnel, skilled and unskilled workers working on various representative construction sites. 142 Contractors registered with National Council for Construction in all grades were sampled and 101 considered.

The research established that the current levels of provision of workers welfare facilities on Zambian construction work sites is low, with most contractors failing to provide appropriate toilet, washing facilities, rest-rooms or shelter, temporary housing, transport to and from place of work, a place to warm up and eat their food from as well as storage facilities for clothing. From the total number of contractors surveyed only 35% had kitchen facilities provided for employees on site while as 21% and 14% had ablution as well as resting facilities respectively.

The research recommends inter alias., that contractors provide appropriate welfare and safety facilities to their employees on construction job site. During tender valuations the contractors' cost allocated to provision of provision of workers welfare facilities and safety in the bills of quantities should be well defined and evaluated competitively. Further, relevant law enforcing agencies should be proactive in conducting regular site inspections to check on contractors' compliance with the existing legislations governing safety and workers welfare. Since employees comprise a vital resource in construction industry, the findings are essential to ensuring that enforcing organisations improve their inspections while contractors are aware of what could cause reduced employee morale and productivity on construction site. The study further promotes sustainable work environment.

Keywords: Construction industry, productivity, welfare facilities,

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List of Abbreviations

NCC	National Council for Construction
ZCI	Zambian Construction Industry
OSH	Occupational Safety and Health
ILO	International Labour Organisation
UN	United Nations
HSE	Health and Safety Executive
RCOHSC	Road Construction Occupational Health and Safety Code
UV	Ultraviolet
EIA	Environmental Impact Assessments
TFP	Total Factor Productivity
PFP	Partial Factor Productivity
PPE	Personal Protective Equipment
ACGIH	American Conference of Governmental Industrial Hygienists

Chapter One: Introduction

1.0 Background

Employees play an important role in the industrial production of the country. Hence, organisations have to secure the cooperation of employees in order to increase the production and to earn higher profits. The cooperation of employees is possible only when they are fully satisfied with their employer and the welfare at work (Parameshwaran and Shamina, 2014).

The term “welfare” proposes many ideas, meanings and connotations, such as the state of wellbeing, health, happiness, prosperity and the development of human resources (Prabakar, 2013). As a total concept; welfare is a desirable state of existence involving physical, mental, moral and emotional wellbeing. The social concept of welfare implies the welfare of man, his family, and his community. Welfare is known as a relative concept, for it is related to time and space. In order to establish a minimum level of welfare, it demands certain minimum acceptable conditions of existence, biologically and socially (Prabakar, 2013).

In the construction industry, the work environment is characterised by its casual nature, temporary relationship between employer and employee, uncertain working hours, lack of basic amenities and inadequacy of welfare facilities (Nasar et al., 2013). These unique characteristics of the construction industry make it distinct in implementation of employee welfare measures compared to other industries (Ibid).

This research therefore, evaluated the provision of workers’ welfare facilities and its effects on productivity on Zambian Construction Sites. This was achieved through the use of mixed approach where both qualitative and quantitative methods were employed accordingly.

1.1 Welfare Facilities in the Construction Industry

Despite its importance, the construction sector is unfortunately notorious for being one of the most hazardous industries along with transportation, mining and agricultural sectors (Murie 2007; Government of Queensland, 2013). The work in construction sector is most hazardous and vulnerable because of poor employment conditions characterised by its casual nature, temporary relationship between employer and employee, uncertain working hours, lack of basic amenities and inadequacy of welfare facilities. These unique characteristics of the construction industry make it difficult to implement labour welfare measures compared to other industries (Nasar et al., 2013). The construction industry is a mobile one; where the workers move from site to site, working in harsh circumstances and living in unhygienic conditions thereby; suffering from serious occupational health problems and are vulnerable to diseases (Kumar and Abdullah, 2013).

A survey conducted among building and civil engineering contractors undertaking projects for the Eastern Cape Department of Roads and Public Works in South Africa revealed that; contractors provide Spartan accommodation and sleeping facilities, rudimentary ablutions, minimal cooking and washing facilities; recreational facilities are marginal (Smallwood and Deacon, 2015). Similar research by Kumar and Abdullah (2013) revealed that the living conditions are no way better than the working conditions for construction workers in India; workers live with their family in temporary shelters built on the construction site. They live in tents built out of rubber and metal sheets, and most of the time the construction companies do not provide any electricity or sanitation facility. The majority of the sites neither have toilets nor bathroom facilities and drinking water is often not available.

Zambia, like many other developing countries, has facilities for workers at construction camp sites that are generally poor and clients do not like such a poor image of the industry (Datta, 2000). Workers are among the most vulnerable to ill-health, poor maternity conditions, disease and disability. The presence of poor working conditions is most prevalent in unskilled labourers as they are often used as a disposable commodity rather than invested in as contributors to a growing business team (Zambian Central Statistical Office, 2012). This therefore, affects productivity as it agrees with Mwiti (2007)'s assertion as cited

in Yamwamu et al, (2012) that absence of the employees welfare facilities is notable through employee performance, attitude, high or low labour turnover.

In addition, lack of familiarity with existing Occupational Safety and Health (OSH) frameworks among employers and workers has been identified as one of the main causes of low rates of compliance. This is due to the fact that most employers in the sector view OSH as a cost rather than an investment and thus pay very little attention to either its legal provisions or promotional aspects (ILO, 2012). Muiruri and Mulinge, (2014) further revealed that some workers felt that the safety equipments such as hard helmets and reinforced boots are too cumbersome and uncomfortable.

1.2 Rationale of the Study

The concept of employee welfare has been used by many organizations as a strategy of improving productivity of employees in many industries, since work related problems can lead to poor quality of life for employees and a decline in performance (Manzini and Gwandure, 2011). Many scholars argue that there exists somewhat a kind of relationship between labour productivity and employee welfare benefits and facilities. Taylor (1911) and Barnes (1980) defined productivity as outputs divided by inputs. The outputs represent products and goods (and later services) generated while the inputs include key resources used for this generation, especially in the immediate factors such as labours, materials, and machines.

Productivity indicates the ability of all related activity to produce. Onitiri (1983) as cited in Yamwamu et al, (2012) argues that poor standards of living, bad health, lack of education, bad housing, poor transportation to and from work, bad conditions in the work place reduce workers' productivity, and low productivity in turn reduces the capacity of the society to improve working conditions, most especially housing, transportation, food and health facilities could substantially improve the workers' productivity. Furthermore, Yesufu (1984) and Ejiofor (1986) as cited in Ayinde (2014) argue that employee welfare benefits and facilities are capable of attracting and retaining employees, assisting employees in meeting their needs better, helping in lowering unit cost of production, improving morale, increasing

employee security and blunting these sharp edges of managerial autocracy. All these, according to these scholars, have a positive effect on labour motivation and productivity.

However, in the construction industry, the work environment is characterised by its casual nature, temporary relationship between employer and employee, uncertain working hours, lack of basic amenities and inadequacy of welfare facilities (Nasar et al., 2013). It is against such background that the Construction workers need appropriate workplace amenities and facilities. The provision of appropriate workplace amenities and facilities is important for the basic health, safety and welfare of employees. This is because welfare measures provided by the employer will have immediate impact on the physical and mental efficiency alertness, morale and overall efficiency of the worker and thereby contributing to the higher productivity (Tiwari, 2014).

It is against such background that ensuring an improvement in the provision workers welfare facilities on the Zambian construction worksites would lead to improved labour productivity output.

1.3 Problem Statement

Having highlighted the challenges associated with the construction industry in the provision of workers welfare facilities. The assertion of the problem statement for this research therefore reads as follows;

‘The Zambian construction industry is associated with numerous challenges in the provision of workers’ welfare facilities on construction sites thereby impacting negatively on productivity’.

1.4 Aim of the Research

The aim of this study is to evaluate the current levels of provision of workers’ welfare facilities and how it impacts on productivity on Zambian construction sites. This will provide knowledge and information necessary to inform decision. Thereby promoting sustainable work environment.

1.5 Research Objectives

The objectives of this research include the following:

- i. Assess the level of provision of welfare facilities on **Zambian Construction Sites**.
- ii. Investigating the awareness levels of the law protecting workers wellbeing on construction sites among employers and employees relative to its application on **Zambian Construction Sites**.
- iii. Evaluating the challenges encountered by workers in relation to the provision of welfare facilities on **Construction Sites**.
- iv. Identifying factors leading to poor welfare facilities as well as non-compliance with the law on workers welfare on **Zambian Construction sites**.
- v. Critically analyse how workers welfare facilities impacts on productivity on **Zambian Construction sites**.
- vi. Make recommendations on how the provision of workers welfare facilities on **Zambian Construction Worksites** could result in improved labour productivity and sustainable work environment.

1.6 Research Questions

The following are the research questions formulated for this study;

- i. How is the provision of welfare facilities on **Zambian Construction sites**?
- ii. What are some of the challenges encountered by workers due to lack of provision of workers welfare facilities?
- iii. What are the factors leading to poor provision of workers welfare facilities as well as non-compliance with the existing law on workers wellbeing on construction sites?
- iv. How much knowledge do employees and employers (contractors) have of the existing laws protecting workers wellbeing on **Zambian Construction sites**?
- v. How does provision of workers welfare facilities impact on productivity on **Zambian Construction Worksites**?

1.7 Scope of the Research

The study evaluated the current provision of employees' welfare facilities on **Zambian Construction worksites** and how it impacts on productivity. The research considered welfare

facilities such as the provision of drinking-water, washing, sanitary and changing accommodation, rest-rooms and shelter, facilities for preparing and eating meals, temporary housing, and assistance in transport from place of residence to the work site and back. It further focused on behaviour and attitudes of employers and employees as with regard to the law protecting workers wellbeing on construction work sites. Lastly, the research identified the challenges affecting workers due to lack or poor provision of workers welfare facilities. Appropriate research methodological procedures and relevant techniques were adopted.

1.8 Significance of the Study

This study is significant in that it creates an understanding and appreciation of the importance of provision of welfare facilities on Zambian Construction Worksites as well as emphasizing its relationship with productivity. More so, this study is important because:

- It highlight the challenges associated with current provision of welfare facilities on Construction worksites and their consequential implications on project delivery. This in turn provides stakeholders with necessary information needed in dealing with issues pertaining to workers welfare.
- Highlight the causes for non-compliance with the existing laws protecting and safeguarding workers on construction sites.
- This study is among the first to be carried out in the ZCI. Thus, it is significant in relation to enhancing the performance and growth of the ZCI.

1.9 Research Methodology

Research methodology refers to the principles and procedures of logical thought processes which are applied to a scientific investigation. Methods concern the techniques which are available for data collection and analysis, and those which are actually employed in a research project (Fellows and Liu, 2008). In order to meet the research aim and objectives set out, the methodology used in this study embraced both the quantitative and qualitative approaches. According to Rajasekar (2006), quantitative research is based on the measurement of quantity or amount. It is applicable to phenomena that can be expressed in terms of quantity. Qualitative research on the other hand is concerned with qualitative phenomenon, i.e., phenomena relating to or involving quality or kind. Qualitative and quantitative

methodologies were employed to investigate, analyze and compile the required information because the study is centered on both the deductive approach and inductive approach. Deductive approach involved developing a theory and research questions as well as designing a research strategy to test the same (Robson, 2002). While as an inductive approach meant an in-depth analysis of multiple sources of relevant data undertaken to examine and discover patterns that reflect the relevant literature (Eisenhardt, 1989).

When different approaches are used to focus on the same phenomenon and they provide the same result, you have "corroboration" which means you have superior evidence for the result. Other important reasons for doing mixed research are to complement one set of results with another, to expand a set of results, or to discover something that would have been missed if only a quantitative or a qualitative approach had been used (Escalada and Heong, 2009).

Qualitative approach shall be used to produce descriptive information for achieving the research objectives. Quantitative methodologies shall be used to investigate, analyze and compile the required quantitative information to achieve the objectives set out for this research.

The following data collection methods shall be employed during the research;

1.9.1 Data Collection Methods

During Data collection, both primary and secondary data sources shall be used to satisfy the objectives of the study.

Secondary Data Collection

A secondary source of information is a document or recording that relates or discusses information originally presented elsewhere (Business Dictionary, 2013). Secondary data sets included information from text books, journals, reports, dissertations, dictionary and published articles. Secondary data sources were used to review the literature considering the fact that other documents related to the study have been written by other authors. This involved among others the use of extensive secondary data such as journals, internet, dissertations.

Primary Data Collection

Primary information is the data that is collected first hand or is original (Business Dictionary, 2013). To facilitate the collection of information in this research, both structured interviews and questionnaires shall be used. Interviews and questionnaires offer an opportunity to make use of the experience of others. Interviews shall be conducted with targeted professionals and construction firms operating in the Zambian construction industry. Questionnaires shall be administered to the concerned professionals within the contractors.

1.10 Research Constraints and Limitations

Due to time constraints as well as limited financial resources though the sample selected included all contractors registered with NCC of Zambia in all grades and categories operating from all the provinces of Zambia only six provinces were considered namely Lusaka, Western, Eastern, Muchinga and Copperbelt provinces. However, it is important to mention that all the necessary sampling procedures and techniques shall be followed to avoid bias.

1.11 Chapter Synthesis

This dissertation consists of five chapters and is organized as follows:

Chapter one introduces the research topic, justifies the research, outlines the research problem, and states the objectives and importance of the study. It also states the research questions, scope, and significance of the study as well as the research methodology adopted. The second chapter meets the second, fourth and fifth objectives which aimed at; evaluating the challenges encountered by workers in relation to the provision of welfare facilities on Construction Sites, identifying factors leading to poor welfare facilities as well as noncompliance on Zambian Construction sites as well as critically analysing how workers welfare facilities impacts on productivity on Zambian Construction sites.

Chapter three discusses the methodology adopted for this research, the chapter starts by firstly discussing the research approach, design and target population, and thereafter the sample size as well as the sampling process and justifications employed are discussed before considering methods of data collection, instruments, methodological reliability as well as validity.

Having laid the basis for the study the fourth chapter presents the actual findings and data presentation as obtained from the interviews and questionnaires administered to relevant research samples. This aimed at satisfying the first, third and fifth research objectives which are assessing the level of provision of welfare facilities on Zambian Construction Sites, investigating the employees awareness levels of the law protecting workers wellbeing on construction sites among employers and employees relative to its application on Zambian Construction Sites.

The fifth chapter discusses and analysis the findings in relation with the existing body of knowledge on the subject matter of provision of employees' welfare facilities relative to its effects on labour productivity.

Lastly, chapter six provides the conclusion and recommendations of the research based on the literature review, findings and analysis in sync with the research questions and objectives.

1.12 Conclusion

This chapter has introduced the study and presented the research problem and the problem background and its justification. The chapter has further highlighted the aim and objectives of the study, and has also discussed the significance of the study. Further in this chapter, the research hypothesis has been formulated and stated. The final part of this chapter has briefly discussed the research methodology used in this study as well as presenting the chapter synthesis for this dissertation.

Chapter Two: Literature Review

2.1 Introduction

There are several factors affecting construction workers due to lack of proper welfare facilities on construction sites. According to Kumar (2013), “the construction industry is a mobile one, where the workers move from site to site. The labourers working in harsh circumstances and living in unhygienic conditions suffer from serious occupational health problems and are vulnerable to diseases (Kaur, 2015). Construction work is featured by high labour turnover, constantly changing work environment and conditions on site, and different type of work being carried out simultaneously. All these factors caused by the temporary nature of the job create a high-risk environment.” According to Pratham (2010) as cited in Kumar (2013), “the living conditions are no way better than the working conditions for construction workers. Usually construction companies do not provide any electricity or sanitation facility. The majority of the sites neither have toilets nor bathroom facilities and drinking water is often not available”.

Therefore, in meeting the second, fourth and fifth research objectives which aimed at; evaluating the challenges encountered by workers in relation to the provision of welfare facilities on Construction Sites, identifying factors leading to poor welfare facilities as well as noncompliance on Zambian Construction sites. This chapter starts by defining workers welfare in general, then it defines a construction worker before discussing welfare facilities on construction sites. Then after, in sync with the fifth research objective the chapter discusses the relationship between provision of workers welfare facilities and productivity. Lastly, various laws protecting construction workers well – being on construction site are highlighted. The aim of this literature review is to draw valuable lessons relevant to this research from the existing body of knowledge on the subject.

2.2 Definition of Welfare

Welfare is a broad concept referring to a state of living of an individual or a group, in a desirable relationship with the total environment – ecological economic and social (Venugopal et al., 2011). It aims at social development by such means as social legislation, social reform social service, social work, social action. The object of economics welfare is to promote economic production and productivity and through development by increasing equitable distribution (Lamongil et al., 2015). Labour welfare is an area of social welfare conceptually and operationally. It covers a broad field and connotes a state of wellbeing, happiness, satisfaction, conservation and development of human resources (Srinivas, 2013).

2.3 Workers' Welfare - In General

The concept of welfare can be approached from various angles (Puja and Sanjeev, 2014). Welfare has been described as a total concept. It covers a broad field and connotes a state of wellbeing, happiness, satisfaction, conservation and development of human resources and also helps to motivation of employees. The word employee means any productivity activity. In a broader sense, therefore, the phrase employee welfare means the adoption of measures to promote the physical, social, psychological and general wellbeing of the working population. Welfare work in any industry aims, or should aim, at improving the working and living conditions of workers and their families (Mishra and Bhagat, 2007).

The concept of employee welfare originates in the desire for a humanitarian approach to the sufferings of the working class (Puja and Sanjeev, 2014). Later, it becomes a utilitarian philosophy which worked as a motivating force for labor and for those who were interested in it. The constituents of labour (employee) welfare included working hours, working conditions, safety, industrial health insurance, workmen's compensation, provident funds, gratuity, pensions, protection against indebtedness, industrial housing, restrooms, canteens, crèches, wash places, toilet facilities, lunches, cinemas, theatres, music, reading rooms, holiday rooms, workers' education, co-operative stores, excursions, playgrounds, and scholarships and other help for education of employees' children. The basic purpose of employee welfare is to enrich the life of employees and to keep them happy and conducted.

Welfare measures may be both Statutory and Non statutory laws require the employer to extend certain benefits to employees in addition to wages or salaries (Srinivas, 2013).

The statutory schemes are those schemes that are compulsory to provide by an organization as compliance to the laws governing employee health and safety (Prabakar, 2013). The non – statutory services and facilities are provided beyond the provision of law to provide congenial surroundings to personal, family and social life of the employees for their physical, mental and emotional well - being. It enables betterment and growth of each and every individual (Prabakar, 2013). Ensuring welfare is a measure of promoting the efficiency of labour. The various welfare measures provided by the employer will have immediate impact on the health, physical and mental efficiency alertness, morale and overall efficiency of the worker and there by contributing to the higher productivity. Some of the facilities and services which fall within the preview of labour welfare include canteen facilities, ablutions, and accommodation arrangements, resting facilities, medical facilities and transportation. (Logasakthi and Rajagopal, 2013).

The basic purpose of employee welfare is to enrich the life of employees and keep them happy (Lalitha and Priyanka, 2014). However, decisions about workplace facilities and the work environment will depend on the industry the business is operating in and the nature of the work carried out. This is due to the fact the concept of labour welfare is flexible and elastic. It differs widely with time, region, industry, social values and customs, degree of industrialization, the general socioeconomic development of the people and the political ideologies prevailing at a particular time. It is also molded according to the age-groups, socio-cultural background, marital and economic status and educational level of the workers in various industries.

2.4 Definition of Construction Workers

Construction workers are those who work predominantly on construction sites and are engaged in the industry excluding design and financing. They are inclusive of both localities and migrants. Persons who are engaged in electrical repair, corporate and plumbers are also included under the category of workers (Muniraju, 2012).

Construction industry is divided broadly into building works and civil engineers. Building works comprise of projects like houses, offices, schools, factories, shops, hospitals, power plant, stations etc. Civil engineering covers works like road, tunnels, bridges, dams, canals, docks etc. Construction industry inclusive of both unskilled and semiskilled labourers and technical and management personnel includes the contractors (Muniraju, 2012). Contractors are responsible persons present at the site providing material, labour, services and equipment which are essential for the project (Ibid).

2.5 Construction Workers Welfare

Work in the construction industry is tough and involves much manual or physical activity. It is hazardous and dirty. Therefore, ensuring provision of good welfare facilities does not only improve workers' well-being but also enhance efficiency (Muiruri and Mulinge, 2014). Welfare facilities such as the provision of drinking-water, washing, sanitary and changing accommodation, rest-rooms and shelter, facilities for preparing and eating meals, temporary housing, assistance in transport from place of residence to the work site and back, all help to reduce fatigue and improve workers' health (Tiwari, 2014). Construction workers need adequate toilet and washing facilities, a place to warm up and eat their food and somewhere to store clothing. The provision of appropriate workplace amenities and facilities is important for the basic health, safety and welfare of employees. The various welfare measures provided by the employer will have immediate impact on the health, physical and mental efficiency alertness, morale and overall efficiency of the worker and thereby contributing to the higher productivity (Ibid).

2.6 Importance of Providing Workers Welfare Facilities

The provision of workers welfare facilities makes the workers realise that they have some stake in the undertaking in which they are employed and so they think thrice before taking any reckless action, which might prejudice the interest of the undertaking (Bagul, 2014). More so, welfare facilities such as subsidised food in canteens, free medical and educational facilities indirectly increase the real income of workers. If the workers go on strike, they will

be deprived of all these facilities (Raman, 2007). Congenial environment as a result of welfare measures will act as a deterrent against such social vices (Prabakar, 2013).

Further, welfare activities influence the sentiments of workers. When workers feel that the employers and the state are interested in their happiness, their tendency to grouse and grumble will steadily disappear. The development of such a feeling paves the way for industrial peace (Bagul, 2014). It also helps in improving good industrial relations and industrial peace. Further employees take active interest in their jobs and work with a feeling of involvement and commitment. Consequently, employers secure the benefits of high efficiency, cordial industrial relations, low absenteeism and low turnover (Monal, 2007). Further Chaudhary and Iqbal (2011) observed that “most underdeveloped countries are in the situation that investment in people is likely to prove as productive, in the purely material sense, as any investment in material resources and in many cases, investment in people would lead to a greater increase of the flow of goods and services than would follow upon any comparable investment in material capital”. The theory that welfare expenditure, especially expenditure on health and education, is productive investment has led to the view that workers could work more productively if they were given a fair deal both at the work place and in the community.

2.7 Factors Leading to Poor Provision of Workers Welfare Facilities in the Construction Industry

Muiruri and Mulinge (2014) noted that some of the major challenges in the management of workers welfare and safety on constructions sites include but not limited to; inadequate enforcement mechanisms, absence of safety and health committees, poor maintenance of personal protective gear, unawareness of welfare and safety matters among the workers on the construction sites as well as lack of top management support in the management of health and safety on construction sites. More so, lack of enforcement mechanisms such as site inspections to check adherence to health and safety requirements on construction work sites is another challenge (Muiruri and Mulinge, 2014).

The high competition has forced contractors to bid projects with minimum profits in order to stay in business. This has placed an added burden on contractors to construct increasingly sophisticated and risky projects with less resources and profits (Ho and Liu 2004). Similarly some site supervisors indicated that lack of adequate funds, lack of monitoring and evaluation, lack of personal protective equipment implementation programs among others as some of the factors that give rise to the above challenges.

Muiruri and Mulinge, (2014) established that culture and attitude of construction workers and the site supervisors about health and safety often condone risk taking and unsafe work practices. More so, that lack of proper information and ignorance are to blame for the poor safety measures in construction sites. Muiruri and Mulinge, (2014) further revealed that some workers felt that the safety equipments such as hard helmets and reinforced boots are too cumbersome and uncomfortable.

In addition, Cotton et al., (2005) noted that the institutional and legal governance frameworks on occupational health and safety in developing countries have little impact. The majority of contractors are small and medium Enterprises operating within their domestic markets where enforcement of health and safety standards and labour standards is very lax. Enforcement of health and safety regulations remains a problem due to lack of adequate resources available to government institutions responsible for occupational health and safety administration. Also, there remains an acute need for contract provisions to support the enforcement of labour laws in developing countries.

Further, lack of familiarity with existing Occupational Safety and Health (OSH) frameworks among employers and workers has been identified as one of the main causes of low rates of compliance. This is due to the fact that most employers in the sector view OSH as a cost rather than an investment and thus pay very little attention to either its legal provisions or promotional aspects (ILO, 2012).

According to Tama et al., (2004) in China the main factors affecting welfare and safety performance include; poor awareness of safety by top management, lack of training and

management's reluctance to input resources in safety performance. Further, that the behavior of contractors on safety management are of grave concern characterised by lack; of provision of personal protection equipment, regular safety meetings, and safety training.

2.8 Standard Welfare, Health and Safety Regulations on a Construction Site

Review of various standard welfare, health and safety regulations governing employees welfare on construction sites opines the provision of; toilets, washing facilities, drinking water, changing rooms, resting facilities, canteen or Kitchen facilities as well as first aid (Health and Safety Executive (HSE) 2010; Road Construction Occupational Health and Safety Code, 2016; Factories Act of Zambia, 1994; IFC, 2009; International Labour Organisation, 2009).

2.8.1 Toilets

According to HSE (2010), so far as is reasonably practicable the employer need to provide flushing toilets and running water, connected to mains water and drainage systems. If this is not possible, facilities with a built-in water supply and drainage tanks should be used. Portable chemical toilets are acceptable only if it is not reasonably practicable to make other adequate provision. HSE (2010) further opines provision of adequate number of toilets, the number needed will depend on the number of workers on site and the type of facilities provided. In Zambia, the Road Construction Occupational Health and Safety Code (RCOHSC) (2016) recommends the following standards for toilet to workers ratios as shown in table 2.1.

Portable toilets have a limited capacity and will need emptying regularly. The number of portable toilets needed depends on the number of persons and the frequency of emptying. Figure 2.1 shows different types of recommend mobile portable toilets.

Table 2.1 Standard toilet to workers ratios

Schedule 1		
Number of workers	No of Sanitary Conveniences	No of wash stations
1 to 5	1	1
6 to 25	2	2
26 to 50	3	3
51 to 75	4	4
76 to 100	5	5

Adapted: (RCOHSC, 2016)



Figure 2.1: Different mobile portable toilets

(Source: RCOHSC, 2016)

Furthermore, for fixed conveniences they should have a reliable supply of water for flushing; discharging in to a public sewer or a purpose made cess pit / septic tank. Figures 2.2 and 2.3 shows a typical picture of toilet facilities on Zambian Construction sites.

The Factories Act of Zambia (1994) opines that well maintained, illuminated, sufficient and suitable sanitary conveniences for both male and female should be provided separately. HSE (2010) adds that “adequate supplies of toilet paper should always be made available as well as sanitary waste disposal in facilities used by female workers”. Sanitary and toilet facilities must be kept in a clean and fully working condition and should be constructed of materials that are easily cleanable and ensure privacy (IFC, 2009). However, for transient sites these are sites with duration of works less than five (5) days, prior agreement with the owner/s for access to suitable (clean) public and/or private facilities has to be made.



Figure 2.2: Fair fixed facility -
Waterborne Ablution facility (Mosi-o-
tunya road) woodlands

(Source: RCOHSC, 2016)



Figure 2.3: Poor fixed Facility -
Shibuyuni Projects

(Source: RCOHSC, 2016)

2.8.2 Washing facilities

Suitable and sufficient washing facilities shall be provided at readily accessible places for all workers. This shall include showers if required due to the nature of work or for health reasons (IFC, 2009). The Factories Act of Zambia (1994) adds that washing facilities with soap shall be provided and be kept clean and in orderly condition. HSE (2010) further provides that washing facilities should be provided next to both toilets and changing areas. They should well ventilation and with sufficient lighting.

According to Road Construction Occupational Health and Safety Code (2016) wash stations shall be provided for each group of workers. As a minimum at all stations there shall be a supply of clean water and soap. The water shall be separate from the drinking water supply and clearly marked as such. Drinking water should not be used for washing purposes. Water may be laid on by tap or kept in suitable containers, whatever is appropriate for the particular site. Washing facilities must be replenished as necessary so as the provision is available on a continuous basis. Figure 2.4: shows poor ablution facilities on typical construction site in Zambia.

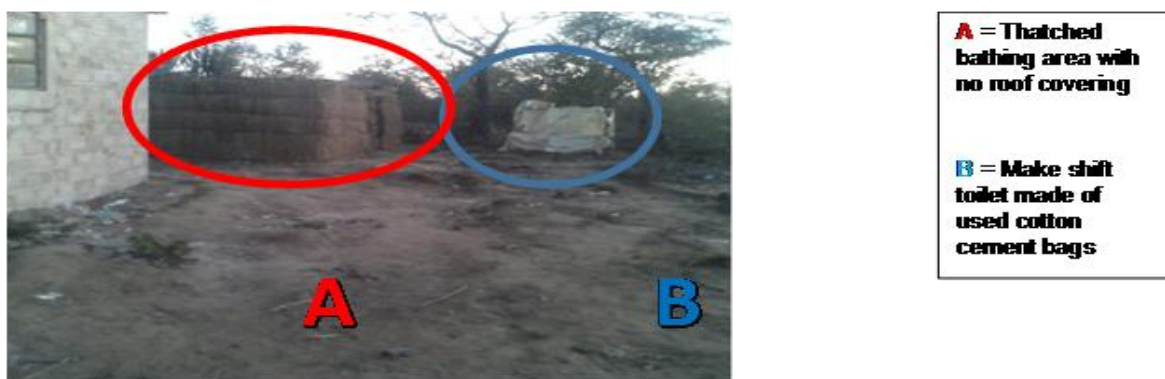


Figure 2.4: Ablution facilities on typical construction site in Zambia
(Source: RCOHSC, 2016)

2.8.3 Drinking water

All contractors shall provide an adequate supply of clean and potable drinking water at suitable locations accessible to all workers employed. Water may for example be laid on by tap or drinking water kept in suitable containers. Whatever arrangements are selected by the contractor, all practicable steps must be taken to preserve the water and vessels from or contamination. Drinking water facilities shall be separate from those provided for washing. The drinking water supply shall be clearly marked “drinking water”. Any temporary tanks or pipe work installed for this purpose shall be removed and the area reinstated on completion of works (RCOHSC, 2016). An example of approved water sources and how they must be labelled in as shown in figure 2.5.

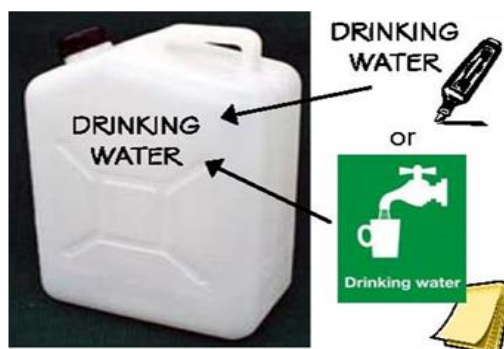


Figure 2.5: Approved water sources.
(Source: RCOHSC, 2016)

2.8.4 Changing rooms and lockers

The Factories Act of Zambia (1994) opines that adequate suitable accommodation of clothes not worn during working hours shall be provided. HSE (2010) further, provides that every site should have arrangements for securely storing personal clothing not worn on site and for protective clothing needed for site work. Men and women should be able to change separately. Separate lockers might be needed, although on smaller sites the site office may be a suitable storage area provided it is kept secure. Where there is a risk of protective site clothing contaminating everyday clothing, items should be stored separately.

2.8.5 Rest facilities

Health and Safety Executive (2010) and the Road Construction Occupational Health and Safety Code (2016) provides for every site to have a resting facility and that it should provide shelter from wind, sun and rain. It further states that these facilities should have adequate numbers of tables, seating with backs, and access to water. More so, that rest areas are not to be used to store plant, equipment or materials. Recommends further that it should be positioned in an area which is free from work related hazards such as traffic, noise and dust.

For transient sites these are sites with duration of works less than five (5) days, RCOHSC (2016) opines use of well ventilated site vehicles or lorry cabs as well as temporary shelter with canvas roof/walls that can quickly be erected and dismantled each day.

2.8.6 Smoking

Smoking is prohibited in enclosed public places and workplaces such as construction sites or work vehicles (HSE, 2010). Smoking is associated with lung cancer, cardiovascular disease, diabetes mellitus and most other respiratory diseases of a chronic nature. It is not clear as to what substance in cigarettes is directly responsible, however, carbon monoxide and nicotine are thought to be the most likely causal agents. Nitrogen oxides, arsenic, cadmium and various other substances have also been incriminated (Phoon, 2001 and Deacon (2004). Furthermore, Phoon (2001) states that "myocardial infarction is substantially more among

manual and unskilled workers, although this is only partially explained by a relatively higher incidence of smoking in that specific group”.

2.8.7 Canteen and cooking facilities

According to IFC (2009), adequate canteen, cooking facilities and equipments should be provided on site. Further, when caterers are contracted to manage kitchens and canteens, special attention should be paid to ensure that contractors take into account and implement the following benchmarks and that adequate reporting and monitoring mechanisms are in place. When workers are expected to individually cook their meals, they should be provided with a space separate from the sleeping areas. Facilities must be kept in a clean and sanitary condition (IFC, 2009). In addition, canteen, kitchen and cooking floors, ceilings and walls should be made of easily cleanable materials.

According to the Zambian Road Construction Occupational Health and Safety Code (2016) employers should ensure facilities are provided for workers to prepare and eat their food without risk of contamination. Figure 2.6 shows poor facilities on a typical Zambian Construction worksite with workers preparing lunch in an open air.



Figure 2.6: Poor cooking facilities - Workers on site preparing lunch in an open air
(Source: RCOHSC, 2016)

2.8.8 First aid

The International Labour Organisation (2009) provides that; the employer shall be responsible for ensuring that first aid, including trained personnel, is available at all times. Arrangements shall be made for ensuring the removal for medical attention of workers who have suffered an accident or sudden illness. There should be a first-aid box and a stretcher

and blanket. On large sites, and always where more than 200 people are employed, there should be a properly equipped first-aid room or hut (Ibid).

2.9 Excessive Exposure to Solar radiation

Solar radiation is the radiant energy emitted by the sun. Sunlight consists of visible light (400–700 nm), infrared radiation (>700 nm) and UV radiation (Percy, 2000). The quality (spectrum) and quantity (intensity) of sunlight are modified during its passage through the atmosphere. The stratosphere stops almost all UV radiation <290 nm (UVC) as well as a large proportion of UVB (70–90 %) (IARC, 2005). Therefore, at ground level, UV radiation represents about 5% of solar energy, and the radiation spectrum is between 290 and 400 nm. An individual's level of exposure to UV varies with latitude, altitude, time of year, time of day, clouding of the sky and other atmospheric components such as air pollution (Ibid).

Ultraviolet radiation is ubiquitous. Almost everyone has some exposure to ultraviolet radiation on a daily basis. It is an exposure we cannot entirely avoid and to strive for zero exposure would create a huge burden of skeletal disease from vitamin D deficiency (WHO, 2006). However, evaluation of the burden of disease created by excess exposure to UVR is very important; human exposure to solar ultraviolet radiation has important public health implications. Evidence of harm associated with overexposure to UV has been demonstrated in many studies. Skin cancer and malignant melanoma are among the most severe health effects, but a series of other health effects have been identified (Lucas et al., 2006).

According to Cherrie (2015) today the risks associated with excessive sun exposure are well known and widely understood. However, in many industry sectors, the risks are not acknowledged or managed properly. This is due to unawareness of the scale of the issue and because of the myths around how sun damage can actually happen as well as misunderstandings around potential vitamin D deficiency from lack of UV exposure. For workers in many industries, hot, humid and hard-working conditions are a fact of life and Construction workers regularly toil outside in hot, humid weather. Excessive exposure to a hot work environment can bring about a variety of heat-induced disorders.

2.9.1 Considerations when working outdoors

When working outdoors the weather can have influence on individual's effectiveness and this is not readily managed using just engineering controls. According to EHS (2001), the human body maintains a fairly constant internal temperature, even when exposed to varying environmental temperatures. To get rid of excess heat, the body varies the rate and amount of blood circulation through the skin and the release of fluid onto the skin by the sweat glands. As environmental temperatures approach normal skin temperature, cooling of the body becomes more difficult as blood brought to the body surface cannot lose its heat (Ibid). At that point, sweat evaporation becomes the principal means to maintain a constant body temperature. Sweating does not cool the body, however, unless the moisture is removed from the skin by evaporation, which is difficult under conditions of high humidity or when wearing heavy protective clothing. Moreover, profuse and prolonged sweating can also disturb normal cardiovascular functions, according to the American Conference of Governmental Industrial Hygienists (ACGIH) (EHS, 2001).

Excessive exposure to a hot work environment can bring about a variety of heat-induced disorders. In fact, after just two hours of moderate work, workers may begin to feel the initial stages of heat stress (Cherrie, 2015). After another hour, they may start to lose strength, energy and focus. At its most severe point, heat stress can result in collapse or unconsciousness.


2.9.2 Challenges associated with excessive exposure to solar radiation

Too much sunlight is harmful to the skin. It can cause skin damage including sunburn, blistering and skin ageing and in the long term can lead to an increased risk of skin cancer (WHO, 2006). Prolonged human exposure to solar UV radiation may result in acute and chronic health effects on the skin, eye and immune system. Excessive sweating leads to loss of water from the body, dehydration and loss of salt, resulting in potentially serious health effects (Shukor, 2012).

Excessive heat causes increase in the likelihood of accidents due to reduced concentration; slippery, sweaty palms; increase of discomfort of some personal protective gear, resulting in reduced protection and unsafe conditions (OSHA, 2014). Health Canada (2011) opines that

“excessive heat may result in dehydration which causes clammy, moist skin, weakness and fatigue, nausea, vomiting, headache and giddiness. Reduced blood flow to the brain may lead to fainting”. Additionally, excessive exposure to the sun results in hot, dry skin and rapidly rising body temperature which can lead to collapse, loss of consciousness, convulsions, even death (Leithead and Lind, 1964)

Table 2. 2 Problems and Symptoms caused by hot temperatures

Temperature range (°C)	Effects	
20 - 27 °C	Comfort zone	Maximum efficiency
 As temperature increases	Discomfort <ul style="list-style-type: none"> • Increased irritability • Loss of concentration • Loss of efficiency in mental tasks 	Mental Problems
	Increase of errors: <ul style="list-style-type: none"> • Loss of efficiency in skilled tasks • More incidents 	Pyscho-physiological problems
	Loss of performance of heavy work: <ul style="list-style-type: none"> • Disturbed water and electrolyte balance • Heavy load on heart and circulation • Fatigue and threat of exhaustion 	Physiological problems
35 - 40°C	Limit of high temperature tolerance	

Adapted: (Shukor, 2012)

According to Shukor (2012), in Canada some of the problems and their symptoms experienced in the temperature range between a comfortable zone (20C - 27°C) and the highest tolerable limits (for most people) are summarized in the table 2.2.

2.9.3 Safety Measures when working in sunny condition

Although the Workplace (Health, Safety and Welfare) Regulations focuses more on indoor workplaces, mention is made that employers have a duty to employees working outdoors such as construction workers. Furthermore, that employers have a duty to protect the health and safety of the workforce by assessing and controlling the risks associated with working in hot temperatures, or exposure to the sun. Among the safety measures recommended as a way of minimising risks include the following (Worksafe, 2012; OSHA, 2014);

- a) Rescheduling work so the hot tasks are performed during the cooler part of the day.
- b) Doing the work at a different location.
- c) Wearing light clothing that still provides adequate protection.
- d) reducing the time spent doing hot tasks (e.g. job rotation)
- e) Arranging for more workers to do the job.
- f) Providing extra rest breaks in a cool area.
- g) Using mechanical aids to reduce physical exertion.
- h) Keeping people away from hot processes.
- i) Providing cool drinking water near the work site. During hot weather, workers should be encouraged to drink water and not rely solely on soft drinks or caffeinated drinks.
- j) Providing personal protective equipment (PPE) such as reflective aprons and face shields for reducing exposure to radiant heat. Outdoor workers should be provided with protection against ultraviolet exposure, such as wide brim hat, loose fitting, long-sleeved collared (preferably cotton) shirt and long pants, sunglasses and sunscreen.
- k) Providing workers with information, instruction and training on recognising heat-related illness and on first aid. Adequate supervision of workers is also required.
- l) Providing first aid facilities and access to medical help.

2.9.4 Regulations on Maximum Temperatures for Working Outdoors

With regard to working outdoors, in Canada there are no regulations specifying standards for maximum temperatures in the workplace (Victorian Trades Hall Council, 2015). However, employers have a duty under the Victorian Occupational Health and Safety Act (2004) to provide and maintain for employees, as far as practicable, a working environment that is safe and without risks to health. This includes providing a safe system of work, information, training, supervision, and where appropriate personal protective equipment. The employer also has the duty to monitor conditions at the workplace - including the temperature (Occupational Health and Safety Act, 2004).

Similarly in Germany the employer is obligated to help employees avoid or minimize damage from excessive UV exposure through appropriate protective measures though there are no legal limits for the amount of exposure to natural UV radiation. However, regarding exposure to artificial UV radiation, since 2006 there has been an exposure limit, as stated in the Guideline 2006/25/EG of the European parliament (radiation Heff 30 J/m² over 8 hours). The limit of exposure to artificial UV radiation was determined to avoid acute skin damage. Though delayed effects were not considered in calculating this value (Fartasch et al., 2012).

2.10 Challenges Affecting Workers Due to Lack of Welfare Facilities on Construction Site

There are several factors affecting construction workers due to lack of proper welfare facilities on construction sites. According to Kumar (2013) “the construction industry is a mobile one, where the workers move from site to site. The labourers working in harsh circumstances and living in unhygienic conditions suffer from serious occupational health problems and are vulnerable to diseases. Death and injury from accidents in the Indian construction sector is widespread. India has the world’s highest accident rate among construction workers”. Survey by Indian Labour Organization (ILO 2009) as cited in Kumar (2013) found that “165 out of every 1000 workers are injured in the construction sector. Construction work is featured by high labour turnover, constantly changing work environment and conditions on site, and different type of work being carried out

simultaneously. All these factors caused by the temporary nature of the job create a high-risk environment.”

A report produced by Pratham (2010) as cited in Kumar (2013) revealed that the children living on construction sites often suffer from malnutrition, under nourishment, accidents, and innumerable health problems. The study also pointed out that in the absence of clean drinking water and flush latrines, cholera and other diseases spread quickly and many people suffer coughs caused by inhaled paint fumes and cement particles. The living conditions are no way better than the working conditions. Construction workers live with their family in temporary shelters built on the construction site. They live in tents built out of rubber and metal sheets. Most of the time the construction companies do not provide any electricity or sanitation facility. The majority of the sites neither have toilets nor bathroom facilities and drinking water is often not available (Ibid).

Abrey and Smallwood (2014) in reviewing the literature in their study on the effects of unsatisfactory working conditions on productivity in the construction industry identified several factors. These include (i) quality of life, (ii) working conditions, (iii) construction image, and, (iv) Lost time injuries.

i. Quality of life

It is important to note that the health of construction workers affects their quality of life (Queensland Government, 2007) as cited in Abrey and Smallwood (2014). Musculoskeletal injuries can result in permanent injuries that can have a significant impact on a person’s working ability, and quality of life. The construction industry has a poor reputation for, inter alia, being an unhealthy industry to work in (HSE, 2012). This is due to the fact that its rate of work related illness is one of the highest of all industries.

ii. Working conditions

Construction workers are exposed to more H& S risks than other industries. The variety of H &S hazards that the construction workers are exposed to include noise, irritant or Sen

siting material, dust, fumes and gases, and other hazardous materials such as asbestos, which result in adverse health risks (Danso, 2012) as cited in Abrey and Smallwood (2014).

iii. Construction image

Reports of building collapse due to poor construction techniques, and an increase in large scale collusion and corruption has resulted in a negative image of the construction industry as a whole. This negative image is mirrored by workforce due to the dangerous nature of the construction work, and the fact that workers are often exposed to unsatisfactory working conditions on construction sites (ILO, 2001) as cited in Abrey and Smallwood (2014).

iv. Lost time injuries

Employers often view OH & S as a cost to be avoided if at all possible, however the cost of occupational accidents and diseases to employers include property damage, lost production time, lost skills as well as the cost of recruiting and training replacements (Department of labour, 2003) as cited in Abrey and Smallwood (2014). There are both indirect and direct cost to employees who incur occupational injuries and diseases. The direct costs suffered by employees include; permanent disabling injuries, loss of employment and income (Ibid) the indirect costs suffered by employees affect their families as a result of a loss of the household, “bread winners” and increased dependence on government supports and grants.

2.11 Defining Productivity

In the construction sector productivity is defined as the quantity of work produced in a given amount of time by a worker or a specific crew, that is, the quantity of construction output units produced in a given amount of time or a unit time (Attar et., al, 2012). Two measures of productivity are commonly used in the construction industry (Jarkas and Bitar, 2012). The first measure of productivity is the total factor productivity (TFP), which is defined as the ratio of total output to total input, with the latter usually including labour, materials, equipment, energy and capital. TFP is expressed as shown in Equation 1:

$$TFP = \frac{\text{Total output}}{\text{Total input}}$$

Eq. 1

The second measure of productivity is the partial factor productivity (PFP), which is expressed as the ratio of the outputs to a single or selected set of inputs. One of the most commonly used PFP measures in construction is labour productivity, which is defined as the ratio of output to labour input; the output is measured in terms of the quantities installed, and labour input is measured as work-hours. Thus, labour productivity is expressed as shown in Equation 2:

$$\text{Labour productivity} = \frac{\text{Total Output}}{\text{Labour Hours}} \quad \text{Eq. 2}$$

The data for computations of the total factor productivity are relatively difficult to obtain, but the measurement process becomes much easier and more controllable when a partial factor measure such as labour productivity is used (Jarkas and Bitar, 2012). Construction is a labour-intensive industry, and labour is the most flexible resource available to the management; thus, the focus on construction labour productivity is clearly justified.

2.11.1 Factors Affecting Labor Productivity

According to Intergraph (2012) there are many factors that affect the productivity of labour in construction. Some of the most recognized factors identified by Intergraph (2012) include:

- a) **Overtime** - Scheduling of extended work days or weeks exceeding a standard eight-hour work day or 40- hour work week lowers work output and efficiency through physical fatigue and poor mental attitude.
- b) **Morale and Attitude** - Spirit of workers based on willingness, confidence, discipline, and cheerfulness to perform work or tasks can be lowered due to a variety of issues, including increased conflicts, disputes, excessive hazards, overtime, over-inspection, multiple contract changes, disruption of work rhythm, poor site conditions, absenteeism, unkempt workspace, and so on.
- c) **Fatigue** - Fatigue can be caused by prolonged or unusual physical exertion.

- d) **Stacking of Trades** - This occurs when operations take place within physically limited space with other contractors, resulting in congestion of personnel, inability to use or locate tools conveniently, increased loss of tools, additional safety hazards, increase visitors, and prevention of crew size optimum.
- e) **Absenteeism and Turnover** - There is a great deal of time and money lost associated with high turnover and absenteeism on projects. Construction projects in certain areas with low manpower and high demand for labor will usually be more impacted than others. Extreme weather conditions (such as extreme heat or cold) will also increase absenteeism and turnover. Replacement workers are usually not familiar with the work or area, and require experienced workers to stop work and show them what to do. The impact can be up to four days of lost work for each worker.
- f) **Mobilize/Demobilize** - This relates to moving resources on and moving off to projects as a result from changes or delays, causing work disruptions. Productivity may drop during these periods as time is lost when crews move from one area or work assignment to another.
- g) **Errors and Omissions** - Increases in errors and omissions impact on labor productivity because changes are then usually performed on a crash basis, out of sequence, cause dilution of supervision, or any other negative impacts.
- h) **Start/Stop** - This results from a work stoppage or suspension of work, which may cause a break in the schedule, usually triggering a start/stop of work activity. Stop-starts can have an impact on productivity and cost of a project. Work scheduled or reassigned during holidays such as Thanksgiving, Christmas, New Year's, and so on are often impacted with stop-starts. Workers tend to discuss the time off and lose previous momentum with a drop in productivity before they get back in routine.
- i) **Crew Size Inefficiency** - This is when the optimal crew size is altered by adding or deleting crew members. When workers are added or deleted from a crew, it breaks up the original team effort and rhythm of the crew and results in loss of productivity.
- j) **Site Access** - This is a result of interferences to the convenient or planned access to work areas. This can be due to blocked stairways, roads, walkways, insufficient man-lifts, or congested work sites.

- k) **Logistics** - Insufficient or poor material handling, owner-furnished material, procurement practices, or a lack of controls can cause procurement or delivery problems, as well as other issues. This then prevents, delays, or disrupts the normal material workflow to a work area, warehouse, or lay- down yard. This can also be a result from the additional replacement or substitution of material due to contract changes, defects, or delays at the work site.
- l) **Confined Space** - When work is in a confined space with limitations on egress and ventilation, this can result in non- productive labour to provide hole watch, along with other issues. Time is also lost when getting to and from the work area.
- m) **Hazardous Work Area** - This is caused when working in an area that is classified as hazardous, requiring special safety equipment and clothing. Restrictions may limit time and exposure of workers to the area, resulting in less time on tools in the area.
- n) **Weather and Season Changes** - Performing work in a change of season, temperature zone, or climate change resulting in work performed in either very hot or very cold weather, rain or snow, or other changes in temperature or climate can impact workers beyond normal conditions.
- o) **Tool and Equipment Shortage** - This is caused when there is insufficient quantity or quality of tools and equipment to meet the needs of the project.
- p) **Poor site conditions** - Arun and Emsley (2001) say effects of poor site conditions vary from site to site and may lead to working difficulties and unsafe working conditions and consequently, accidents may occur, which cause delay. They further say that those accidents may cause the construction labour production levels to decline. That means the construction sites need to be as clean as possible so as to reduce number of accident on construction workers. The decline in accidents will also reduce turnover and absenteeism which may lead to increased construction productivity.
- q) **Lack of supervision** - Brent (2013) opined that construction workers must be closely monitored to achieve the desired levels of productivity. Jarkas and Bitar (2012) also supported by saying that inadequate supervision is a key reason for idle time on construction projects. Soekiman et al (2011) also opined that supervision is the principal issue affecting productivity. So due to lack of proper supervision construction workers

tends to waste time if they are not monitored. If they are tightly monitored they will be no time lost and productivity levels will increase.

- r) **Payment delay** - Brent (2013) says delays of employee payment may occur as a result of cash flow originating from the client, the contractor, or by poor planning/management of funds on the project. Regardless of the source, labour is only concerned with the bottom line and any disputes could severely hamper progress. When the contractor suffers from delayed payments that mean the construction labour will also be delayed to get their wages and that alone can cause the construction productivity levels to decrease (Zou et al. 2007).
- s) **Employee Training/Skills** - According to Brent (2013) poorly trained workers could severely impact output and diminish the quality of work produced. If construction companies take training seriously, their productivity levels will increase and projects will be completed in time without any delays.

2.11.2 The Relationship between Provision of Workers Welfare Facilities and Productivity

Many scholars argue that there exists a relationship between labour productivity and employee welfare benefits and facilities. For instance, Onitiri (1983) as cited in Yamwamu et al, (2012) contend that poor standards of living, bad health, lack of education, bad housing, poor transportation to and from work, bad conditions in the work place reduce workers' productivity, and low productivity in turn reduces the capacity of the society to improve working conditions, most especially housing, transportation, food and health facilities could substantially improve the workers' productivity. Yesufu (1984) and Ejiofor (1986) as cited in Ayinde (2014) argued that employee welfare benefits and facilities are capable of attracting and retaining employees, assisting employees in meeting their needs better, helping in lowering unit cost of production, improving morale, increasing employee security and blunting these sharp edges of managerial autocracy. All these, according to these scholars, have a positive effect on labour motivation and productivity.

The concept of employee welfare has been used by many organizations as a strategy of improving productivity of employees in many industries since work related problems can

lead to poor quality of life for employees and a decline in performance (Manzini and Gwandure, 2011).

Priti (2009) asserts that provision of welfare facilities promotes economic development by increasing efficiency and productivity with the underlying principle being making workers give their loyal services ungrudgingly in genuine spirit of co-operation and the general wellbeing of the employee. Despite this, Mwiti (2007) as cited in Yamwamu et al, (2012) points out that naturally welfare facilities may not directly relate to an employee's job but the presence or absence of the facilities is notable through employee performance, attitude, high or low labour turnover.

2.12 Laws Protecting Employees in Zambia

The basis of the legal framework for industrial relations in Zambia originates from the fundamental rights in the Constitution of Zambia and more particularly from a provision in Article 21. The other legal instrument which aims at protecting the employers and employees rights as well as the environment in which they operate include Occupational Health and Safety Act, Factories Act, Workers Compensation Act, Mines and Minerals Development Act, Environmental Management Act, Public Health Act, Industrial and labour relations Act, and Employment Act.

2.12.1 Occupational Health and Safety Institute – Occupational Health and Safety Act No. 36 of 2010

The OHS Act (2010) is among others set to establish the Occupational Health and Safety Institute and provide for its functions; provide for the establishment of health and safety committees at workplaces and for the health, safety and welfare of persons at work; provide for the duties of manufacturers, importers and suppliers of articles, devices, items and substances for use at work; provide for the protection of persons, other than persons at work, against risks to health or safety arising from, or in connection with, the activities of persons at work; and provide for matters connected with, or incidental to, the foregoing (National Assembly of Zambia, 2010).

2.12.2 Factories Act No 13 of 1994, Cap 441 of the Laws of Zambia

An Act to make further and better provision for the regulation of the conditions of employment in factories and other places as regards the safety, health and welfare of persons employed therein; to provide for the safety, examination and inspection of certain plant and machinery; and to provide for purposes incidental to or connected with the matters aforesaid (Ministry of legal affairs, 1967). The Factories Act provides for occupational safety and health in factories, construction sites and other workplaces. The Act empowers Factory Inspectors to enforce occupational safety and health regulations at workplaces. Concern has been expressed over the limitations of this Act particularly with regard to occupational safety and health in the agricultural sector and indeed other employment places falling outside the scope of the Act. Discussions to establish an all-embracing occupational health and safety standards are progressing. It states that:

- Washing facilities shall be provided and be kept clean and in orderly condition. Soap must be provided.
- Adequate suitable accommodation of clothes not worn during working during hours shall be provided.
- Suitable sitting facilities shall be provided for employees where such action shall not be detriment to their work.

2.12.3 Workers ‘Compensation Fund – Workers’ Compensation Act No. 10 of 1999, Cap271 of the Laws of Zambia

An Act to make provision for the establishment and administration of a fund for the compensation of workers disabled by accidents to, or diseases contracted by, such workers in the course of their employment, and for the payment of compensation to dependants of Workers who die as a result of such accidents or diseases; for the payment of contributions to such Fund by employers; for the grant of pensions and allowances to certain dependants of Workers who, being in receipt of pensions for such disablement, die from causes not connected with such accidents or diseases; for the appointment and powers of a Workers' Compensation Commissioner and the establishment and powers of a Workers' Compensation Board and an Appeal Tribunal; and for matters incidental to and connected with the foregoing (Ministry of legal affairs, 1999).

2.12.4 The Mines and Minerals Development Act No. 11 of 2015, Cap 165 of the Laws of Zambia

An Act to revise the law relating to the exploration for, mining and processing of, minerals; provide for safety, health and environmental protection in mining operations; provide for the establishment of the Mining Appeals Tribunal; repeal and replace the Mines and Minerals Development Act, 2008; and provide for matters connected with, or incidental to, the foregoing (National Assembly of Zambia, 2015).

2.12.5 Public Health Act No. 22 of 1995, CAP 295 of the Laws of Zambia

Section 78 of the Public Health Act states that it is the duty of every Local Authority to prevent any pollution dangerous to health of any water which the public has a right to use and does use for drinking or domestic purposes. It provides that all construction works must be undertaken in a manner that is not hazardous to the health of the public. The Public Health Act is the law that provides for the prevention and suppression of diseases; and it regulates all matters connected to public health.

2.12.6 Zambia Environmental Management Authority – The Environment and the Environmental Management Act No. 11 of 2011

The Environmental Management Act of 2011 was enacted by the Parliament of Zambia to establish the Zambia Environmental Management Agency (former Environmental Council); provide for integrated environmental management and the sustainable use and management of natural resources; and to address emerging environmental issues and challenges such as climate change and pollution from persistent organic pollutants and electronic waste. The Act addresses the need for implementing environmental safeguards in the environment and natural resource management sector, by setting out the requirements for carrying out Environmental Impact Assessments (EIA) and Strategic Environmental Assessments (National Assembly of Zambia, 2011).

2.12.7 Employment Act Cap 268 of the Laws of Zambia

An Act to provide legislation relating to the employment of persons; to make provision for the engagement of persons on contracts of service and to provide for the form of and enforcement of contracts of service; to make provision for the appointment of officers of the Labour Department and for the conferring of powers on such officers and upon medical officers; to make provision for the protection of wages of employees; to provide for the control of employment agencies; and to provide for matters incidental to and consequential upon the foregoing. It provides for enforcement of contracts of employment, protection of wages and welfare of employees. This Act was also extensively amended in 1997 to take into account among others ILO Conventions which Zambia has ratified relating to minimum contractual age, termination of employment, protection of wages, and maternity protection. Concern has been expressed that there is insufficient protective provisions in the Act covering work people infected with or affected by HIV/AIDS pandemic. Consensus has since been built up for a need to incorporate protective provisions in this or other appropriate labour laws particularly with regard to discrimination.

2.12.8 Industrial and Labour Relations Act No. 27 of 1993

An Act to revise the law relating to trade unions, the Zambia Congress of Trade Unions, employers' associations, the Zambia Federation of Employers, recognition agreements and collective agreements, settlement of collective disputes, strikes, lockouts, essential services and the Tripartite Labour Consultative Council; the Industrial Relations Court; to repeal and replace the Industrial Relations Act, 1990; and to provide for matters connected with or incidental to the foregoing (Ministry of legal Affairs, 1993).

The Act provides the legislative framework for the establishment, organization and management of trade unions, employer's organizations and their federations. It provides for collective bargaining, settlement of industrial conflicts, consultative mechanism and the establishment and operation of the Industrial Relations Court.

2.13 Conclusion

From the literature reviewed the chapter established that the Construction industry has a poor reputation for; being an unhealthy industry to work in, this is due to the fact that its rate of work related illness is one of the highest of all industries, and workers are exposed to more H&S risks than other industries. The assortment of hazards that the construction workers are exposed to include permanent disabling injuries, loss of employment and income. Furthermore, the indirect costs suffered by employees affect their families as a result of a loss of the household, “bread winners” and increased dependence on government supports and grants, workers are often exposed to unsatisfactory working conditions on construction sites.

More so, lack of familiarity with existing legislation on workers welfare among employers and workers contributes by leading to low rates of compliance. This is made worse due to the fact that most employers in the sector view OSH as a cost rather than an investment and thus pay very little attention to either its legal provisions or promotional aspects. Lastly, the chapter reviewed some of the existing relevant legal legislations protecting employees in Zambia. This was done to ascertain how much the law provides for relative to low or non-compliance levels in the general Construction Industry.

Chapter Three: Research Methodology

3.1 Introduction

In previous chapter, literature was reviewed aimed at; evaluating the challenges encountered by workers in relation to the provision of welfare facilities on Construction Sites, identifying factors leading to poor welfare facilities as well as non - compliance on Zambian Construction sites as well as critically analysing how workers welfare facilities impacts on productivity on Zambian Construction sites. Having laid the basis for the study, this chapter discusses research methodology. It entails reformulating the problem to be investigated, selection of a suitable research design, appropriate procedures for data collection, findings and analysis. The research problem is encapsulated in the research objectives earlier mentioned in chapter one (1.5).

The objectives of this research include the following:

- i. Assess the level of provision of welfare facilities on Zambian Construction Sites.
- ii. Investigating the awareness levels of the law protecting workers wellbeing on construction sites among employers and employees relative to its application on Zambian Construction Sites.
- iii. Evaluating the challenges encountered by workers in relation to the provision of welfare facilities on Construction Sites.
- iv. Identifying factors leading to poor welfare facilities as well as non-compliance with the law on workers welfare on Zambian Construction sites.
- v. Critically analyse how workers welfare facilities impacts on productivity on Zambian Construction sites.
- vi. Make recommendations on how the provision of workers welfare facilities on Zambian Construction Worksites could result in improved labour productivity and sustainable work environment.

After discussing the research design, research approach, sampling, data collection methods and analysis will be discussed in that order.

3.2 Research Approach

The research methodology used in this study embraced both the quantitative and qualitative approaches. According to Rajasekar (2006), quantitative research is based on the measurement of quantity or amount. It is applicable to phenomena that can be expressed in terms of quantity. Qualitative research on the other hand is concerned with qualitative phenomenon, i.e., phenomena relating to or involving quality or kind. Qualitative and quantitative methodologies were employed to investigate, analyze and compile the required information because the study is centered on both the deductive approach and inductive approach. Deductive approach involved developing a theory and research questions as well as designing a research strategy to test the same (Robson, 2002). While as an inductive approach meant an in-depth analysis of multiple sources of relevant data undertaken to examine and discover patterns that reflect the relevant literature (Eisenhardt, 1989).

Qualitative research design uses a wide range of data gathering strategies, including structured, semi-structured and unstructured interviews (Mason, 2010). The choice of structured, semi-structured, or unstructured interviews depends upon whether questions and expected response categories are pre-planned, structured and standardised across differing respondents and situations. A balanced choice helps researchers limit potential bias while maintaining question flexibility and variation (Johannes, 2004).

Quantitative-based research on the other hand is concerned with qualitative phenomena. The qualitative can be used to develop the understanding required for evaluating if a variable is relevant or not to a given problem situation, qualitative approach uses a range of data gathering strategies among them a questionnaire (Sekaran, 1992).

When different approaches are used to focus on the same phenomenon and they provide the same result, you have "corroboration" which means you have superior evidence for the result. Other important reasons for doing mixed research are to complement one set of results with another, to expand a set of results, or to discover something that would have been missed if only a quantitative or a qualitative approach had been used (Escalada and Heong, 2009).

Tashakkori and Teddlie (2003) as cited in Mndeme (2011) argue that multiple methods are useful if they provide better opportunities for answering research questions and where they allow one to better evaluate the extent to which research findings can be trusted and inferences made from them. For example, interviews may be a valuable way of triangulating data collected by other means such as a questionnaire.

Hence, the nature and purpose of research will influence the research method and approach adopted, appropriately chosen methods are important to guarantee creation of knowledge and validation of effective research. They set the research in a system which makes it defensible and reproducible. The purpose of a research project defines which approach to take, methods, tools and techniques to choose, hence in this deductive process of reasoning the approach adopted is both qualitative and quantitative.

3.3 Research Design

Burns and Grove (2003) define a research design as “a blueprint for conducting a study with maximum control over factors that may interfere with the validity of the findings”. Parahoo (1997) describes a research design as “a plan that describes how, when and where data are to be collected and analysed”. The design adopted is descriptive and explanatory combining both qualitative and quantitative. Furthermore, in measuring the relationship between provision of welfare facilities and productivity the case study design was employed.

Descriptive because it is designed to provide a real picture of a situation as it naturally happens. It has been used in evaluating the challenges encountered by workers in relation to the provision of welfare facilities on Construction Sites as well as identifying factors leading to poor welfare facilities as well as non-compliance with the law on workers welfare through the reviewed literature. Explanatory because it involves assessing the level of provision of welfare facilities on Zambian Construction Sites, investigating the awareness levels of the law protecting workers wellbeing on construction sites among employers and employees relative to its application on Zambian Construction Sites as well as critically analysing how workers welfare facilities impacts on productivity on Zambian Construction sites, this is achieved through field research. Qualitative and quantitative is adopted for

triangulation purposes. This is effective because a balanced choice helps researchers limit potential bias while maintaining question flexibility and variation (Johannes, 2004). The nature and purpose of research has influenced the research approach in terms of the location of the study or target population, its duration, sampling design, data collection methods, and analytical procedures.

3.3.1 Case Study

The design employed further included case studies on various sites found with and without employees' welfare facilities. A case study is a holistic inquiry whose goal is to gain insight, explore the depth and complexity inherent in a contemporary phenomenon. It is used to have a hand on all details and gain in-depth understanding of the chosen sample case instead of the whole population (Tourki, 2010).

The main reason for choosing a case study approach method for this research is that the reality is captured in great detail. Zainal (2007) argued that case studies not only help to explore or describe the data in real-life environment, but also help to explain the complexities of real life situations which may not be captured through experimental or survey research. The study intended to provide an in-depth description of the relationship between provision of welfare facilities and employees' productivity on Zambian Construction worksites.

The use of case study is explanatory because it entails an in-depth study into how workers welfare facilities impacts on productivity on Zambian Construction sites, this is achieved through observations and interviews.

3.4 Target Population

The population is the entire set of individuals (or objects) having some common characteristics as defined by the sampling criteria established for the study (Burns & Grove 1998; Polit & Hungler 1999). Further, Parahoo (1997) defines population as "the total number of units from which data can be collected", such as individuals, artefacts, events or organisations. Burns and Grove (2003) define eligibility criteria as "a list of characteristics that are required for the membership in the target population."

In this study, the population of informants from whom a sample was selected to participate were National Council for Construction Registered Contractors in all grades and categories. These are Contractors from grade one to six accordingly.

3.4.1 Registered Contractors in all grades and categories of National Council for Construction (NCC) in Zambia

These contractors were targeted as they consist of all businesses or entities registered and operating as contractors in the Zambian Construction Industry (ZCI). Therefore, any research conducted in the ZCI with a justified representation of from these category forms the basis for generalisation and conclusions of the Zambian situation. Therefore, having considered a reasonable sample representative of this population this research has well represented and presented the Zambian construction industry.

In achieving reliability and validity of data collected the following professionals and workmen were engaged through structured questionnaires and interviews:

3.4.2 Site Management Personnel

These included the Project or Construction managers, Engineers, Quantity Surveyors, Safety Officers as well as Foremen; were targeted because they are the ones in-charge of supervising, managing and co-ordinating the employees' activities on site as well as in ensuring compliance to minimum welfare, health and safety measures on a construction site. Furthermore, these professionals are able to interpret how workers welfare, behaviours and activities impact on productivity.

3.4.3 Skilled Workers on Construction sites

Skilled workers on site included Bricklayers, Carpenters, Plumbers, and Steel fixers, Electricians, Welders, Tilers, Painters and Machine Operators. These employees were considered in this research due to the fact that these are ones who in most cases are fully engaged on site with the actual construction works off course supervised by the relevant professionals. Therefore, experience the benefits and challenges of the prevailing welfare

facilities conditions hence making them resourceful in providing reliable research data sought for consideration.

3.4.4 Unskilled Workers on Construction Sites

Similarly, this category of the workforce which included the General workers, Cleaners as well as Helpers were considered for the research because these are the ones who are affected the most by the prevailing site working conditions. More so, it is these people who are mostly undertaking manual, hazardous and physical work characterizing the construction sector. The construction sector which according to Nasar et al., (2013) is described as most hazardous and vulnerable because of poor employment conditions characterised by “its casual nature, temporary relationship between employer and employee, uncertain working hours, lack of basic amenities and inadequacy of welfare facilities”. Table 3.1 shows the summary of the research target group as well as the justification for the sampling methods used.

Table 3. 1 Summary of the target group together with the justification of sampling methods adopted

No	Target group	Sampling method	Justification
1.	Project or Construction managers, Engineers, Qs, Safety Officers and foremen	Random	In-charge of supervising, managing and co-ordinating the employees' activities on site.
2.	Skilled Workers	Random	Fully engaged on site with the actual construction works.
3.	Unskilled Workers	Random	Mostly undertaking manual, hazardous and physical work characterizing the construction sector.

Source: Author, 2016

3.5 Sample

A sample is a relatively small subset of a population that is intended to represent, or stand in for, the population in a research (Heiman, 2011). It defines the selected groups of elements, that is, individuals, groups and organisations. The sample is chosen from the study population that is commonly referred to as the “target population or accessible population” (Burns & Grove 1998; Polit & Hungler 1999).

The sample selected includes contractors registered with NCC of Zambia in grades one, two, three, four, five and six respectively from all the provinces of Zambia though mostly those operating in Lusaka, Western, Eastern, Muchinga and Copperbelt provinces were considered due to time limitations and financial resources.

3.5.1 Sampling process

Burns and Grove (2003) refer to sampling as a process of selecting a group of people, events or behaviour with which to conduct a study. In this research a combination of sampling strategies was employed. In research one of the most important features distinguishing what is commonly referred to as qualitative from quantitative inquiry is the kind of sampling used. While qualitative research typically involves purposeful sampling to enhance understanding of the information-rich case (Patton, 1990), quantitative research ideally involves probability sampling to permit statistical inferences to be made. Although purposeful sampling is oriented toward the development of idiographic knowledge from generalizations from and about individual cases probability sampling is oriented toward the development of nomothetic knowledge, from generalizations from samples to populations. Notwithstanding these key differences, purposeful and probability sampling techniques can be combined usefully.

3.5.2 Stratified random sampling

Fink (1995) as cited in Latham (2007) defined stratified random sampling as “one in which the population is divided into subgroups or ‘strata,’ and a random sample is then selected from each subgroup”. Stratified sampling is used when representatives from each subgroup within the population need to be represented in the sample. The first step in stratified

sampling is to divide the population into subgroups (strata) based on mutually exclusive criteria. Random or systematic samples are then taken from each subgroup (Westfall, 2009). Two types of stratified random sampling include proportionate and disproportionate.

Proportionate stratification is “often done to insure representation of groups that have importance to the research” and disproportionate is “done to allow analysis of some particular strata members or to increase the overall precision of the sample estimates” (Henry, 1990). The big difference between the two stems from the use of a fraction. Proportionate stratified uses the same fraction for each subgroup and disproportionate uses different fractions for each subgroup. To choose which is right for a research project, the researcher must be aware of the various numbers of members in each subgroup (Latham, 2007).

Latham (2007) further said “for instance a population of churches in Lubbock, Texas. Whereas the First Baptist Church may have 700 members in the subgroup, the Assembly of God may only have 130 members.” Dividing the population into a series of relevant strata means that the sample is more likely to be representative, as the researcher can ensure that each of the strata is represented proportionally within the sample, an illustration of the sample frame using this method is shown in table 3.2 where contractors are divided into six strata according to their respective NCC grading having samples selected using proportionate method of stratified random technique for three strata namely grade one, two and three. While as for the other strata of contractors in grade four, five and six disproportionate stratified random technique was adopted this was due to the fact that they are huge discrepancies in numbers for contractors in higher grades and those in low grades making it difficult to use only proportionate method as this agrees with Latham (2007) assertion that “to choose which is right for a research project, the researcher must be aware of the various numbers of members in each subgroup”.

Table 3. 2 Summary of the sample frame consisting of contractors in grades one to six of NCC

No	Category	Registered
1.	Grade one contractors	134
2.	Grade two contractors	60
3.	Grade three contractors	124
4.	Grade four contractors	382
5.	Grade five contractors	736
6.	Grade six contractors	1987
7.	Total	3427

(Source: NCC, 2014)

3.5.3 Purposive sampling

Purposive non-probability sample is also known as judgment or judgmental (Babbie 1990; Jones 1955. It is referred to as purposeful by MacNealy 1999). This sampling strategy is employed when there is a very large pool of potentially information-rich cases and no obvious reason to choose one case over another. Purposive sampling was used in the selection of a representative sample from the population of interest. The five provinces selected for the research were Lusaka, Western, Eastern, Muchinga and Copperbelt provinces this is due to the fact that a balanced representation of contractors are found in Lusaka and Copperbelt provinces of Zambia also due to time and financial limitations. Parahoo (1997) as cited in Annan (2014) describes purposive sampling as “a method of sampling where the researcher deliberately chooses who to include in the study based on their ability to provide necessary data”. The rationale for choosing this approach was that it enables the use of judgement to select cases that can best answer the research question(s) and meet the research objectives.

3.5.4 Sample size and Justification

In an academic research such as this one, for a sample size to be representative of the chosen population, it must not be less than 5% of the population size (Judd et al, 1991). However, since the research had a view of obtaining a larger sample representation % was adopted. Therefore, by using this guide, the sample size shall be chosen as shown in table 3. For the

purposes of selecting a fair sample from each stratum, the following formula was adopted for this research:

$$ni = \frac{Nin}{N}$$

Equation 1: simple random sample (SRS)

Where **ni** = the sample from the stratum

Ni = % population adopted by the research

N = % total population

n = stratum size

For example, a sample for contractors was selected as follows:

$$ni = \left(\frac{50}{318} \right) 134 = 21.06918 \approx 22$$

Table 3. 3 Sample size justification

No	Category of Contractors	Sampling method	Total population	Sample size (rounded
1.	Grade one	Probability	134	21.07 ≈ 22
2.	Grade two	Probability	60	9.43 ≈ 10
3.	Grade three	Probability	124	19.50 ≈ 20
4.	Grade four	Probability	382	30
5.	Grade five	Probability	736	30
6.	Grade six	Probability	1987	30
7.	Total		3, 423	142

Source: Author, 2016

3.6 Methods of Data Collection and Instruments

Data collection is defined by Bhattacharjee (2012) as the precise and a systematic gathering of information relevant to the research sub-problems, using methods such as interviews, participant observation, questionnaire completion, focus group discussion, narratives and case studies or histories through the use of quantitative or qualitative methods. The main purpose of data collection is to verify the research questions or hypotheses. The types of data collection methods and instruments adopted for this research approach (combination of both

qualitative and quantitative) includes the use of instruments such as structured and unstructured interviews as well as mailed and self-administered questionnaires.

3.6.1 Interviews

Interviewing refers to structured or unstructured verbal communication between the researcher and the subject in which information is presented to the researcher (Burns & Grove 1998). Structured interviews use questionnaires based on a predetermined and 'standardised' or identical set of questions and are referred to as interviewer-administered questionnaires. Each question is read out and the response recorded on a standardised schedule, usually with pre-coded answers. While there also structured interviews which are used to collect quantifiable data they are also referred to as 'quantitative research interviews'.

Advantages of interviews:

- i. Usually yield richest data, details, and new insights.
- ii. Permit face-to-face contact with respondents.
- iii. Provide opportunity to explore topics in depth.
- iv. Allow interviewer to experience the affective as well as cognitive aspects of responses.
- v. Allow interviewer to explain or help clarify questions, increasing the likelihood of useful responses.
- vi. Allow interviewer to be flexible in administering interview to particular individuals or in particular circumstances.

Application

Structured interviews were used in this research to obtain information from respondents that could easily be reached and have meetings arranged with whereas unstructured interviews were used with the view to obtain answers to questions that require respondents to give detailed but yet extensive explanations.

3.6.2 Questionnaires

A questionnaire has been defined by Brown, (2001) as any written instruments that present respondents with a series of questions or statements to which they are to react either by writing out their answers or selecting from among existing answers. Interviewer-administered questionnaires as well as self-administered questionnaires shall be used in this research relative to situational appropriateness. The questionnaires/interviews were prepared in line with the following:

- a. Provision of welfare facilities on Construction sites.
- b. Welfare facilities on construction site in relation to productivity.
- c. Employees' rights in relation to the provision of workers wellbeing.

Advantages of Questionnaires

The Questionnaire was used because of the following advantages as cited in Choudhury (2016).

i. Economical

It is an economical way of accumulating information. It is economical both for the sender and for the respondent in time, effort and cost. The cost of conducting the study with the help of questionnaire method is very low. In questionnaire the researcher has to spend for paper printing and postage only. There is no need to visit each and every respondent personally. So it does not require high cost for conduct of the research (Ibid).

ii. Wide Coverage

Questionnaire makes it possible to contact with many people who could not otherwise be reached. It can cover a large group at the same time. Goode and Hatt say that when the researcher has to cover the group of respondents who are widely scattered, lie can use the questionnaire in order to minimize the cost (Ibid).

iii. Rapidity

Replies may be received very quickly in questionnaire method. In this case there is no need to visit the respondent personally or continue the study over a long period. Thor “fore in comparison with other methods, the mailed questionnaire is the quickest method (Ibid).

iv. Suitable in Special Type of Response

The information about certain personal, secret matters can be best obtained through questionnaire method. For example, information about sexual relationship, marital relationship, secret desires etc. can be easily obtained by 'keeping the names of the respondents anonymous (Ibid).

v. Repetitive Information

Compared to other methods like schedule, interview or observation, questionnaire method is regarded as more useful and cheap, where the repetitive information has to be collected at regular interval.

vi. An Easier Method

Questionnaire is comparatively an easier method to plan, construct and administer. It does not require much technical skill or knowledge.

vii. It Puts Less Pressure on the Respondents

It puts less pressure on the respondents for immediate response. He can answer it at his own leisure, whereas interview or observation demands specific fixation of time and situation.

viii. Uniformity

It helps in focusing the respondent's attention on all the significant items. As it is administered, in a written form, its standardized instructions for recording responses ensure some uniformity. Questionnaire does not permit much of variation.

ix. Greater Validity

Questionnaire has some unique merits as regards validity of information. In methods like interview and observation, the reliability of responses depends on the way the investigator has recorded them. Here they may present biased or prejudiced information of their own. But in questionnaire method, the responses given by the subjects are available in their own language and version. Therefore, it cannot be wrongly interpreted by the researcher.

x. Anonymity

Questionnaire ensures anonymity to its respondents. The respondents have a greater confidence that they will not be identified by anybody for giving a particular view or opinion. They feel more comfortable and free to express their view in this method.

Disadvantages of questionnaires

Milne (1999) indicated the following as some of the disadvantages of using a questionnaire for data collection, which the researcher need to be mindful;

- i. Questionnaires are standardised so it is not possible to explain any points in the questions that participants might misinterpret.
- ii. Open-ended questions can generate large amounts of data that can take a long time to process and analyse.
- iii. Respondents may answer superficially especially if the questionnaire takes a long time to complete.
- iv. Respondents may not be willing to answer the questions.

Application

In this research questionnaire were used because, they are less costly, ease in administering, reduces on the potential interviewer bias, allows for flexibility in time for answering the questionnaires, convenient and useful for future reference.

3.7 Methodological Reliability

Joppe (2000) as cited in Golafshani (2003) defines reliability as “the extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable”. Therefore, in ensuring the reliability of the data collected in this research similar structure questionnaires as well as interviews were administered and sought respectively among Construction professionals, skilled and unskilled workforce on various constructions sites in various districts and provinces of Zambia. These workforce engaged were those working on actual construction sites with relatively substantial experience and on each site visited a questionnaire coupled with similar interview schedule were administered from top managers to unskilled workers.

This was to ensure consistency in the data collected making the research reliable as it agrees with (Tasir, Online 2016) assertion that reliability is the consistency of your measurement, or the degree to which an instrument measures the same way each time it is used under the same condition with the same subjects.

3.8 Methodological Validity

Trochim (2006) defines validity it as the "best available approximation to the truth or falsity of a given inference, proposition or conclusion." Validity indicates the as the extent to which the research measures what it purports to measure (Carole et al., 2008) Two types of validity exist namely, internal and external. Internal validity refers to whether the study adequately describes the phenomenon it sets out to examine, in the ability to draw inferences from observations. External validity refers to inference of the causal relationships of the research findings and the extent to which they can be generalized (Khorsan and Crawford, 2014). Hence, reliability and validity of the data that was collected is meant to minimize measurement error, bias, and enhance the thoroughness of the research findings and their interpretability.

3.9 Data Analysis and Presentation

Data analysis consists of examining, categorizing, tabulating, testing, or otherwise recombining both quantitative and qualitative evidence to address the initial propositions of a study (Yin, 2003). In general, data analysis refers to the computation of certain measures along with searching for patterns of relationship that exist among data-groups (Kothari, 2004). Kohlbacher (2005) further states that once a pattern is identified, it is interpreted in terms of a social theory or the setting in which it occurred and that the qualitative researcher moves from the description of a historical event or social setting to a more general interpretation of its meaning.

Frequency distribution data analysis technique was adopted for this research. Frequency distribution is a data analysis technique which allows the research to get a big picture of the data from frequency distribution, the researcher can see how frequently the specific values

are observed and what their percentages are for similar variables (Li, 2013). Histogram is a great tool in Excel for computing the frequencies for numerical variables (Ibid).

Data presentation took the form of histograms, pie charts, tables and graphs. Software such as Microsoft excel and word were used to present the results collected during field survey.

All data from the field research was considered as findings and analyzed appropriately.

- Quantitative – based on numerical count and mathematical application through statistical analysis. This will be done by means of use percentages, bar charts and pie charts for simple descriptive display of categorical data where there is no emphasis on percentages of a total represented by each category.
- Qualitative – it gives the researcher an interpretative character. It will help get the information through descriptive analysis and to explain the findings in detail relative to the existing literature.

3.9.1 Case Study Data Analysis

Kohlbacher (2005) states that "the ultimate goal of the case study is to uncover patterns, determine meanings, construct conclusions and build theory" According to (Yin, 2003, Kohlbacher, 2005) there are three general analytic strategies for analyzing case study evidence these include; relying on theoretical propositions, thinking about rival explanations and developing a case description. Furthermore, that any of these strategies can be used in practicing five specific techniques for analyzing case studies: pattern matching, explanation building, time-series analysis, logic models, and cross-case synthesis.

Hartley (2004) opines that checking the findings with the case study participants can be a valuable part of the analysis and can enhance validity. Besides, the analyzing of data is enhanced by reference to the existing literature and using this to raise questions about whether the researcher's findings are consistent with or different from extant research.

Finally, Stake (2000) as cited in Kohlbacher (2005) notes that a "case study is both a process of inquiry about the case and the product of that inquiry," namely the report. Therefore, the

report of the relationship between provisions of welfare facilities on construction sites need to be reported on relative to the set out objectives.

3.10 Conclusion

In this chapter the methodology adopted for this research has been discussed, this was accomplished by the appropriate research approach, design and target population, thereafter, the sample size, sampling process as well as its reasonable justification this was important in ensuring representativeness of the research population.

Furthermore, the methods and instruments of data collection employed have been discussed thoroughly together with appropriate research methodological reliability and validity.

Chapter Four: Findings and Data Presentation

4.1 Introduction

The previous chapter discussed the following areas; research methodology adopted for this study to satisfy the research objectives as set out in chapter one, research approach, research design, research population, the sample, sampling process and justification. This is important as it provides the basis on which the findings of the research can be generalized and authenticated.

4.2 Background to the Findings

The information that was obtained from respondents during the field research is presented and analysed so as to draw conclusions and recommendations for the research. The presentation of findings was aimed at meeting the overall objective of the study which is to confirm the assertion that the Zambian construction industry is associated with numerous challenges in the provision of workers' welfare facilities on construction sites thereby impacting negatively on productivity.

4.3 Sample Sizes and Response Rate

Table 4. 1 Summary of population sizes, Sources: NCC, 2014. Sample sizes and response rates

Population category	population size	Sample size	Successful responses	Response rate (%)
Grade 1	134	22	17	77.27%
Grade 2	60	10	6	60%
Grade 3	124	20	15	75%
Grade 4	382	30	19	63.33%
Grade 5	736	30	20	66.67%
Grade 6	1987	30	24	80%
Total	3427	142	101	70.38%

A total number of 142 contractors from grade one to six were drawn from the population of interest. The sample was drawn from target groups and summarized as shown in table 4.1. From table 4.1, a total number of 142 questionnaires were administered and the overall response was at 101, thus the general response rate was 70.38%.

4.4 Findings and Discussion

4.4.1 Provision of welfare facilities on construction work sites.

An assessment was carried out to ascertain the current levels of provision of workers welfare facilities on Zambian construction work sites. The findings were as shown in figure 4.1.

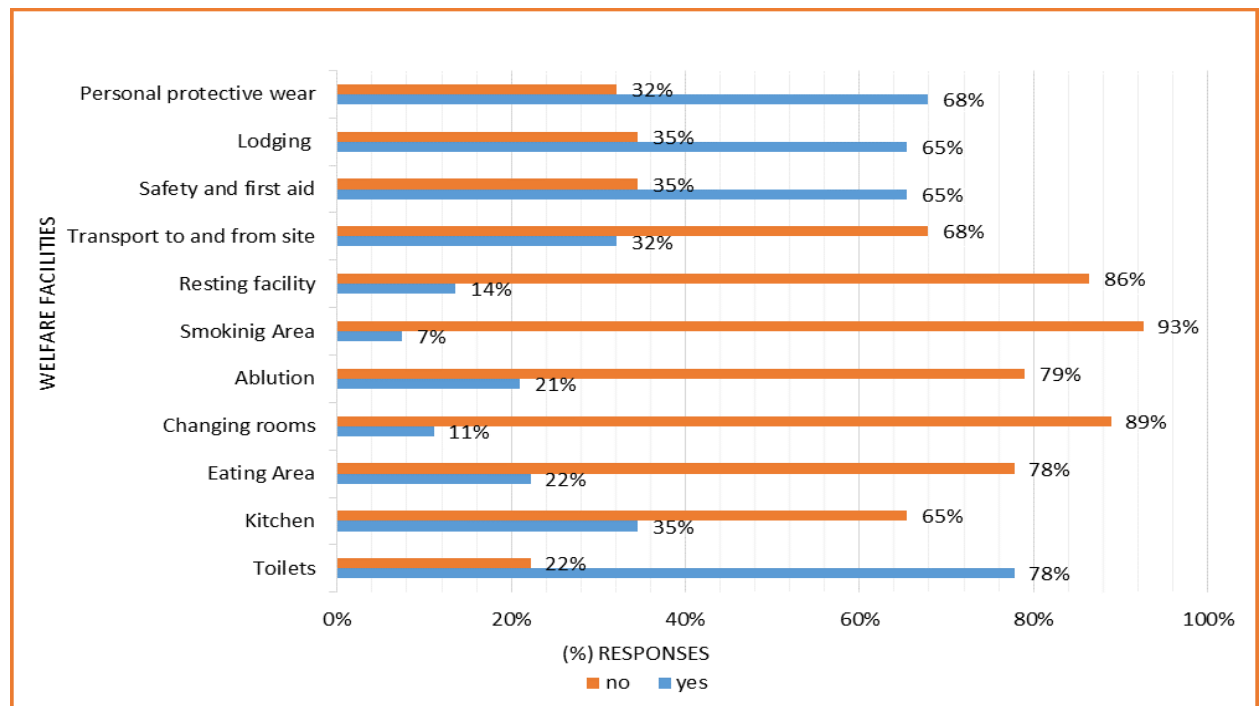


Figure 4. 1: Level of provision of welfare facilities on Zambian Construction work sites.

4.4.2 Toilet facilities on Construction work sites

The research revealed that 72% of the contractors surveyed had toilet facility provided for workers on construction sites as shown in figure 4.1. However, through interviews the research further established that of those contractors who had provided toilet facilities only 52% were made of either concrete conventional blocks or clay bricks, 8% were made of

timber, 12% metal sheets, glass thatch 12%, empty sacks 2%, 4% were made from used card boards with 4% made from plastics as shown in figure 4.2.

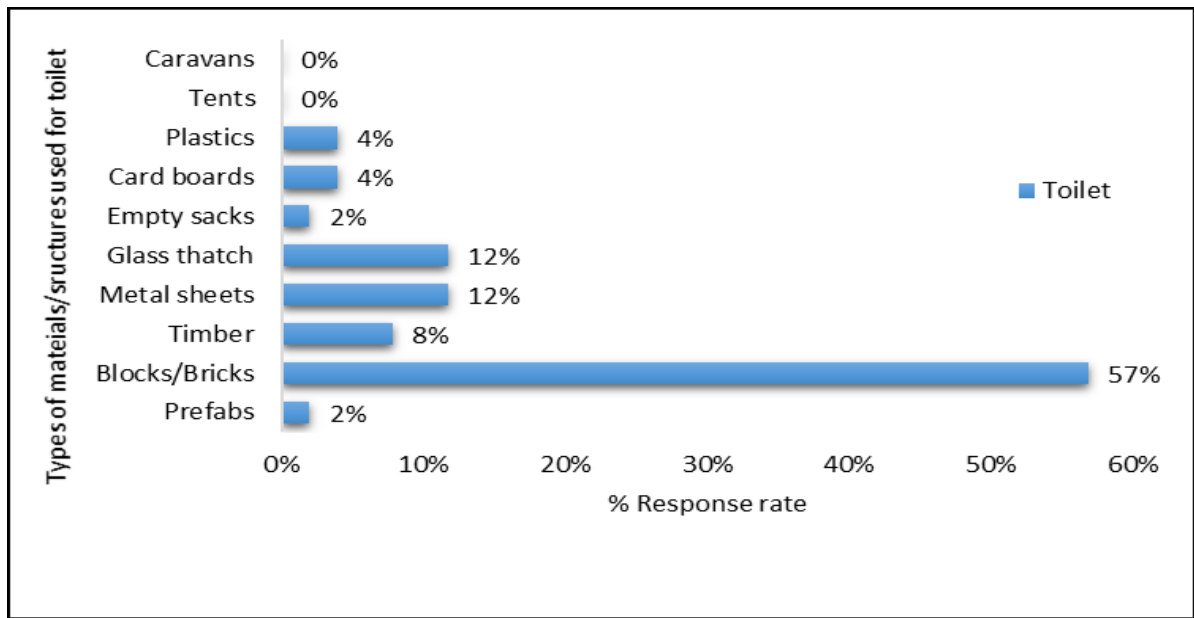


Figure 4. 2: Types of materials used for the toilet toilets.

4.4.3 Kitchen and Eating facilities on Zambian construction work sites

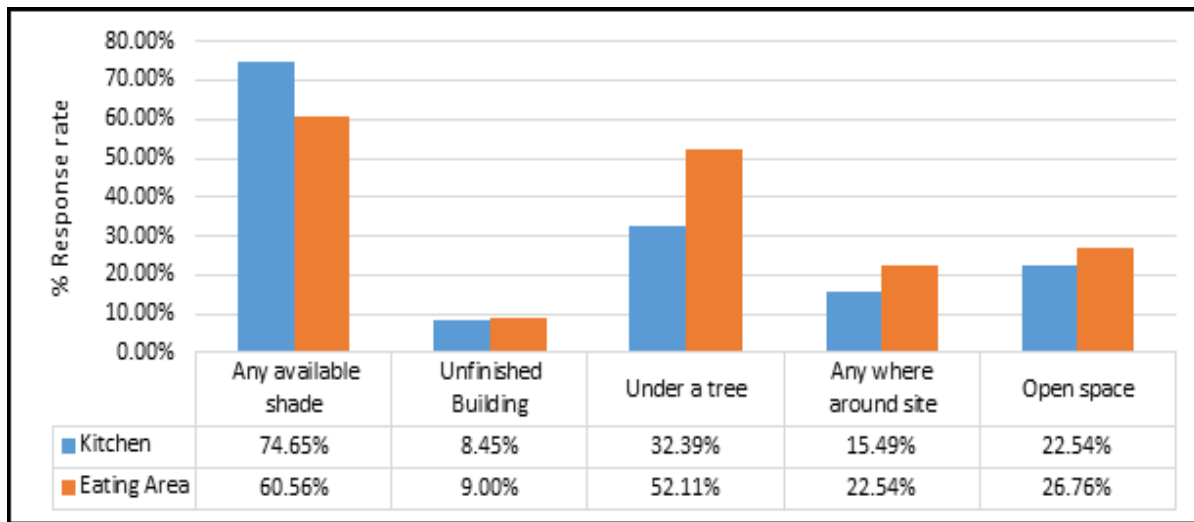


Figure 4. 3: Common options for employees if not provided with kitchen or eating facilities on Construction work sites.

The findings revealed that only 35% of the projects surveyed had kitchen facilities provided for employees on construction sites. Furthermore, that 65% of the workers on site either

cook from any available shade within site, under a tree, open spaces, anywhere around site or in unfinished buildings as shown in figure 4.3.

Similarly, on the eating facility the findings indicated that only 22% of projects surveyed had eating facility provided on site for employees. Lack or low levels of provision of such facilities on site result in some employees having to eat from any available shade, open space, office table or just anywhere they can find a shade, under a tree if the site has one or inside unfinished building where the shade can be found as highlighted in figure 4.3. More so, figure 4.4 shows cooking areas on two different Construction work sites in Lusaka, Zambia.



Figure 4. 4: Kitchen areas on two construction sites, with empty tins of paint used as pots.

4.4.4 Changing room and Ablution facilities for employees on Construction work sites

The research revealed that only 11% of the contractors surveyed had a changing room facility provided for workers on site as shown in figure 4.1. This resulted in some workers having to report for work with a work suit on, while others had to change from the bush, nearby public facilities, toilets or where ever they could find privacy as shown in figure 4.5.

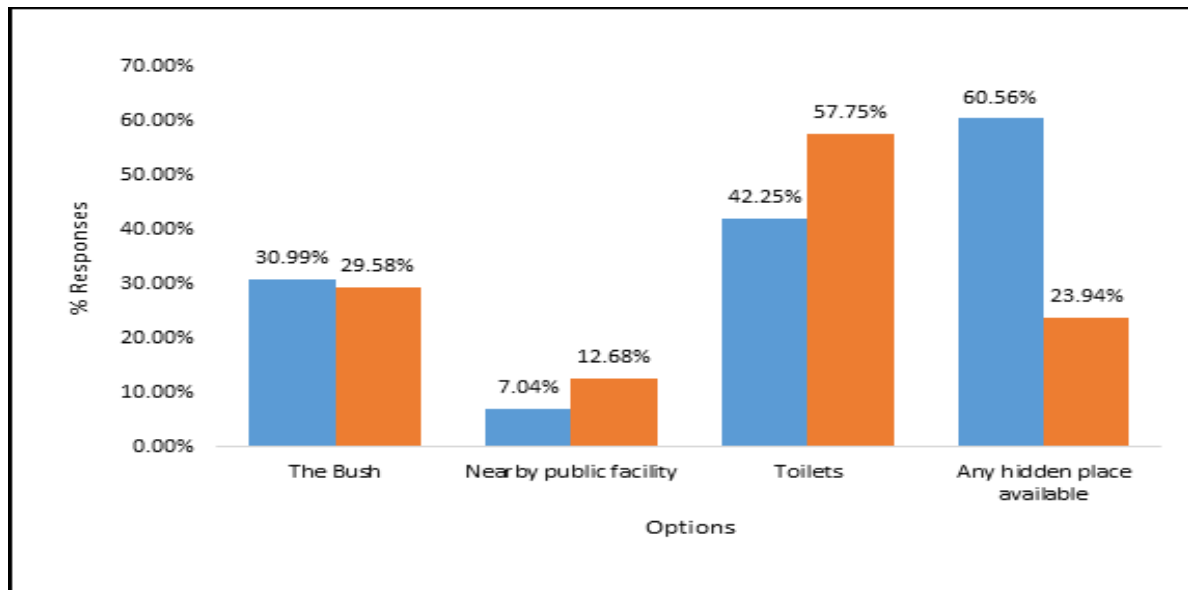


Figure 4. 5: Available options for employees if not provided with ablutions or change rooms facilities on Construction work sites.

On the ablution (washing) facilities the research established that most worker resorted to using the toilets if they wanted to wash themselves after work, alternatively others opted to utilise the bush, nearby public facilities or any hidden place around site as shown in figure 4.5.

4.4.5 Provision of transport to workers on Zambian construction work sites

Figure 4.2 shows that only 32% of the contractors surveyed had transport provision for workers to and from construction work sites. The research further revealed that 33% of the respondents reported for work on foot, 28% used public transport, while as 27% used bicycles with 12% of employees indicating to have depended on hiking or begging as a mode of transport to and from site as shown in figure 4.6.

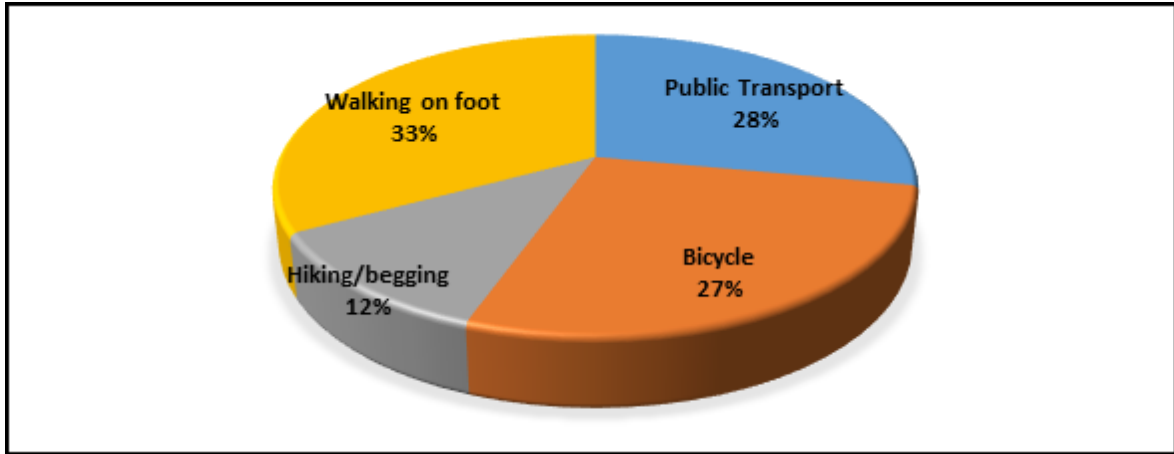


Figure 4. 6: Employees mode of transport to and from work on sites not provided with transport.

The research further revealed that some employees had to walk for more than 60 minutes from home to actual construction worksite as shown in figure 4.7.

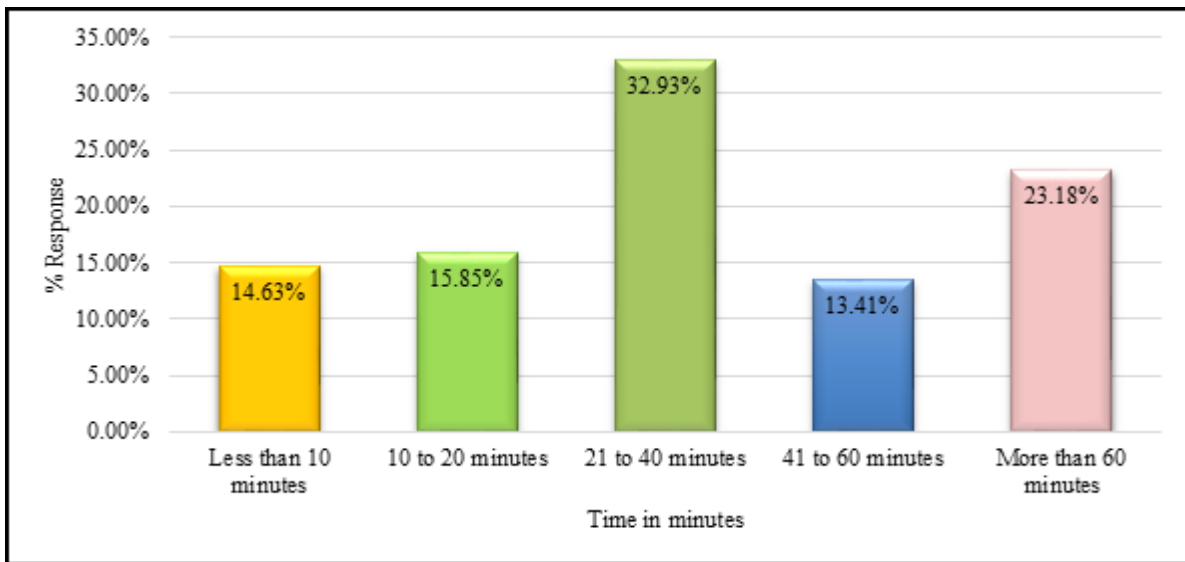


Figure 4. 2: Duration taken by employees to move from home to work.

4.4.6 First aid, safety and Lodging facilities for employees on work sites

On provision first aid and safety facilities 65% of the contractors surveyed revealed that they had provided such facilities respectively for workers on work site as indicated in figure 4.1. Similarly, a further assessment on the provision of lodging facilities to employee working far from their home established that 65% of the contractors had either provided or rented lodging facilities for employees though mostly poor facilities as shown in figure 4.8.



Figure 4. 8: Cards boards used as a bed and mattress on a construction site in Lusaka, Zambia.

4.4.7 Provision of smoking Areas.

Despite having had 55% of the contractors surveyed having allowed smoking on construction site with 22% of the respondents not being sure, only 7% had areas demarcated as smoking zones on site as evidenced in figure 4.1. More so, the study indicated that 64% of the workers on Zambian work sites smoke from wherever they wish as long as they are no flammable substances, 24% smoke anywhere on site but excuse themselves away from fellow workers while 9% revealed that they seek for permission to smoke off site as shown in figure 4.9.

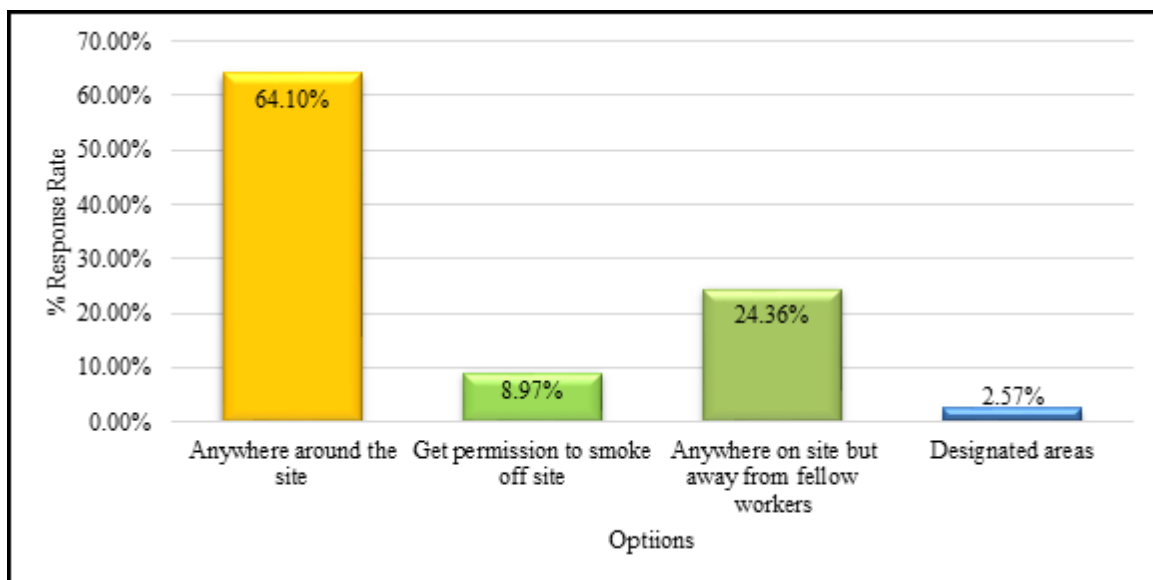


Figure 4. 9: Options of where workers (smokers) on Zambian construction sites smoke from.

4.4.8 Provision of Resting Facilities.

On resting facilities the study revealed that only 14% of the contractors surveyed had provided resting facilities on site for employees. This means that in case of rains, excessive sun, lunch time or resting time employees resort to using either; any available shade on site, unfinished buildings, under trees or anywhere they can find shelter as shown in figures 4.10.

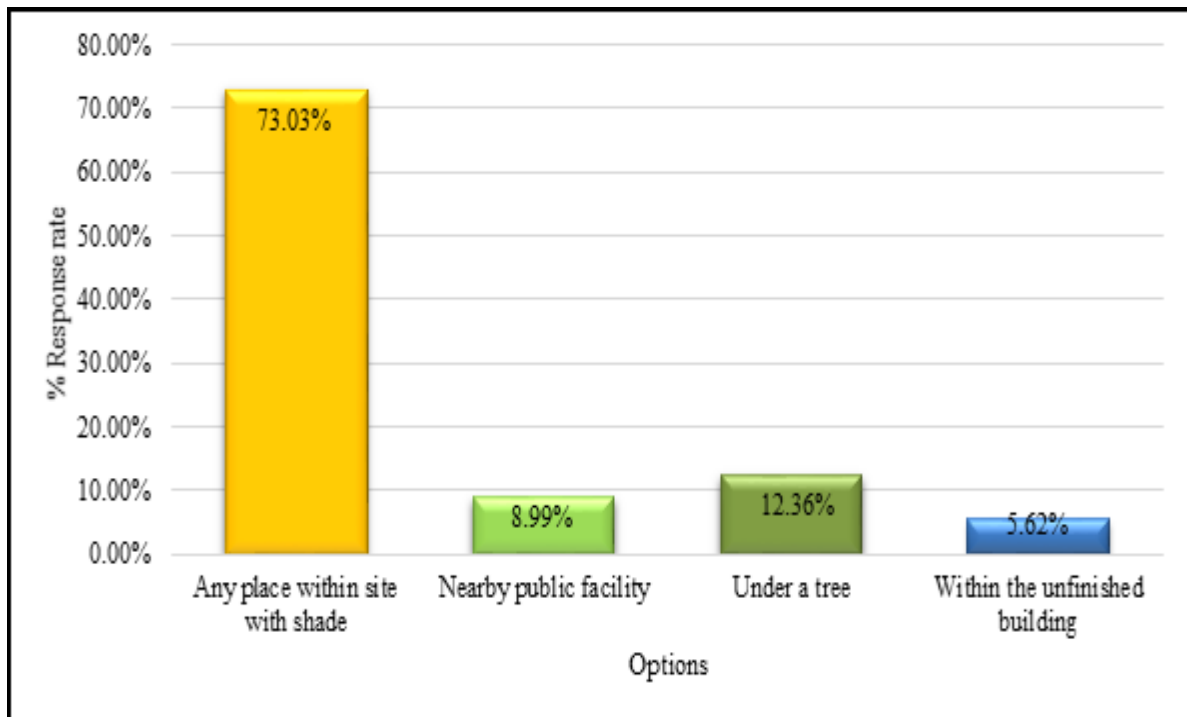


Figure 4. 10: Options of where workers rest from on Zambian construction sites.

Furthermore, figures 4.11 shows workers on a construction site in Lusaka resting under a tree during a tree during lunch time



Figure 4. 11: Workers on a construction site in Lusaka resting under a tree during lunch time.

The HSE (2010), opines that rest facilities should provide shelter from wind and rain. It further states that these facilities should have adequate numbers of tables, seating with backs, and access to water. According to the HSE (2010), rest areas are not to be used to store plant, equipment or materials.

As a result of failure to provide for such facilities, some workers on Zambian sites tended to go far from site to where they can get rest hence resulting in late return to work and sometimes even drunk hence slowing down productivity.

4.4.9 Acceptable temperature for employees to work on a construction site in the ZCI

15% of the respondents indicated that they had knowledge of the acceptable maximum temperature for employees to work on site. 51% were not sure while 34% had no knowledge as shown in figure 4.12.

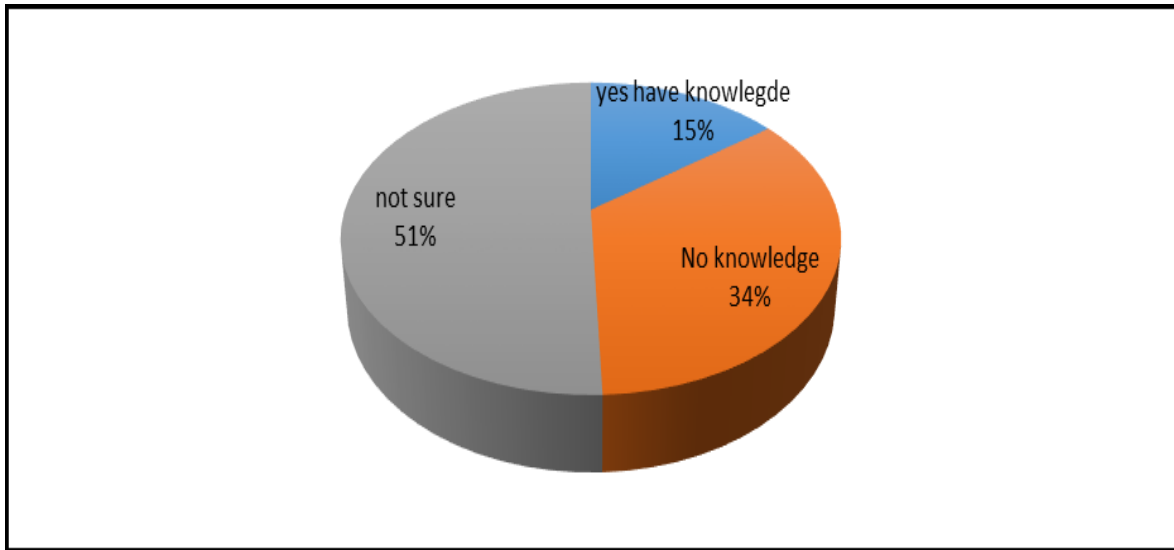


Figure 4. 12: Level of knowledge of acceptable temperature for employees to work on construction sites.

Furthermore, interviews revealed that though some employers claimed to have had knowledge of the acceptable maximum temperature for employees to work on site. Occupational Health and Safety institute of Zambia revealed that Zambia has no regulations specifying standards for maximum temperatures on the workplace.

4.4.10 Workers common complaints resulting from excessive exposure or working in sunny condition on a construction site

The research revealed that the most common complaints resulting from excessive exposure or working in sunny condition on a construction site among respondents included the following; premature ageing, heat exhaustion, fainting, headache, thirst and dizziness as shown as in Figure 4.13.

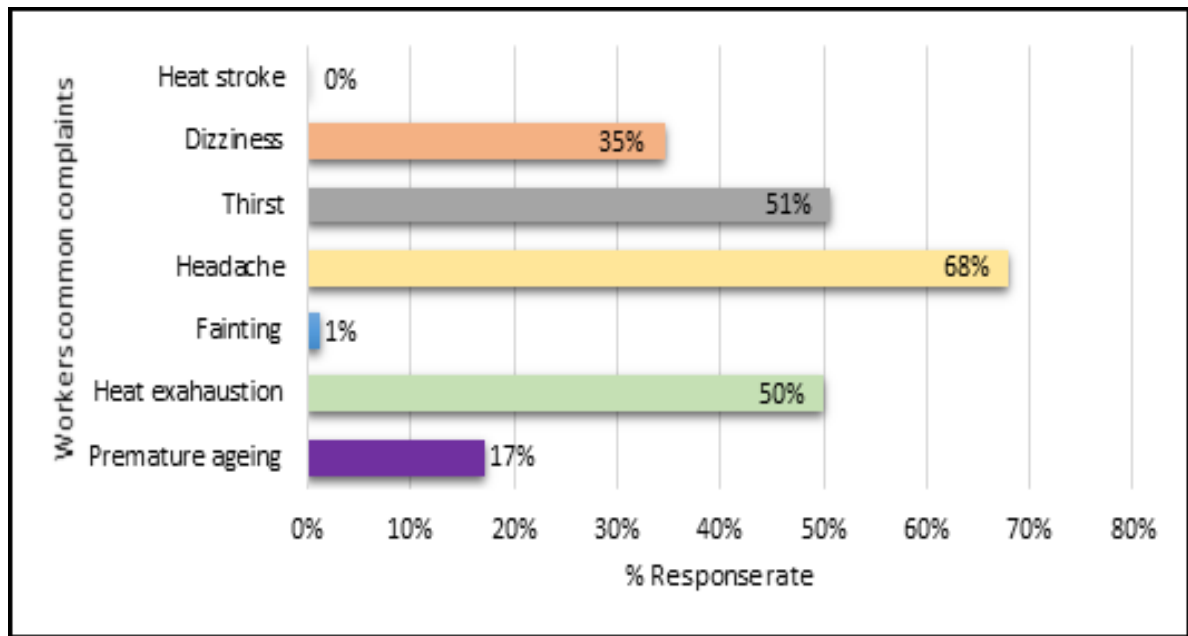


Figure 4. 13: Common complaints from employees working on site when exposed to solar radiation.

The findings revealed that; premature ageing, heat exhaustion, fainting, headache, thirst and dizziness as the common complaints by due to prolonged exposure to sunlight. This confirms WHO (Online, 2016) that “too much sunlight is harmful to the skin. It can cause skin damage including sunburn, blistering and skin ageing and in the long term can lead to an increased risk of skin cancer. Prolonged human exposure to solar UV radiation may result in acute and chronic health effects on the skin, eye and immune system. Sunburn (erythema) is the best-known acute effect of excessive UV radiation exposure. Over the longer term, UV radiation induces degenerative changes in cells of the skin, fibrous tissue and blood vessels leading to premature skin aging, photodermatoses and actinic keratoses. Another long-term effect is an inflammatory reaction of the eye. In the most serious cases, skin cancer and cataracts can occur”.

4.4.11 Safety measures when exposed to excessive sun on a Zambian construction sites

On the safety measures employed by management when workers are working or exposed to heat or excessive sunlight on a Zambian construction the respondents’ indicated the following; 41% provided sufficient cool drinking water, 30% encouraged workers to take plenty water to replenish the body fluids lost through sweating, 1% allowed workers to cool

down and reduce their exposure to hot environment through taking regular breaks and rotating duties and worksites; 7% made arrangements for workers to rest in cool or shady place during hot periods; 1% provided shower and washing facilities for washing and external cooling; 2% indicated wearing clothing that is light-colored and loose-fitting as a safety measure in place. 35% recommended use of naturally ventilated helmet and lastly 42% of the respondents had target based way working (umugwazo i.e. workers are given targets which upon finishing they can knock off and will be considered to have worked a full shift) as shown in figure 4.14.

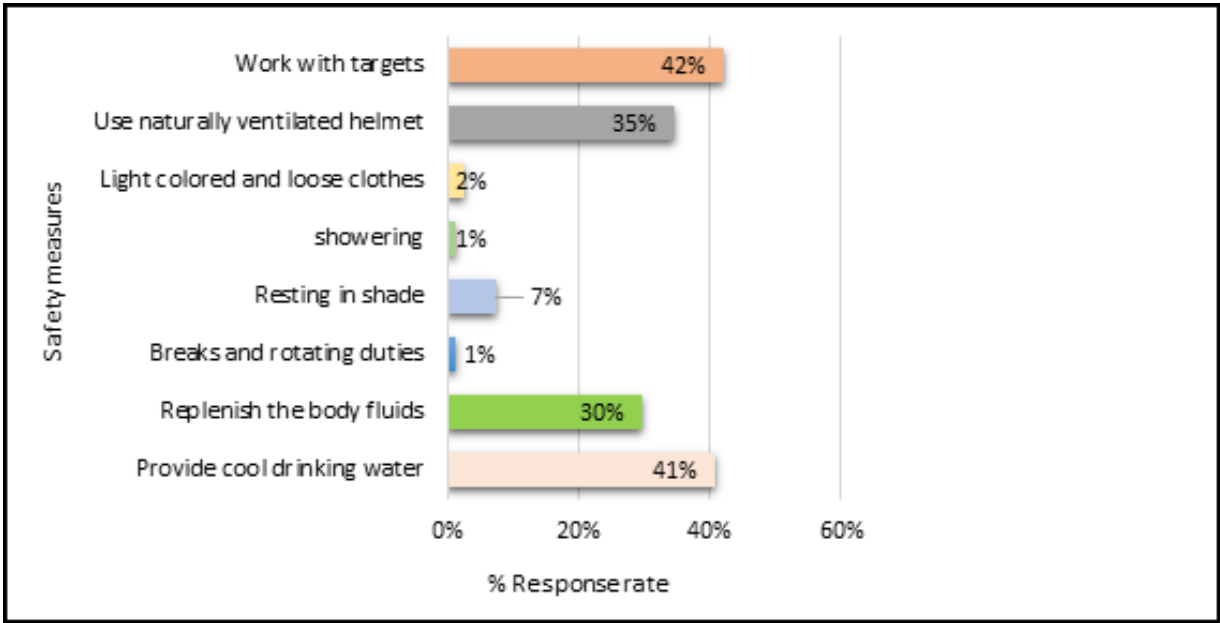


Figure 4. 14: Safety measures when working in excessive sun light on site.

4.5 Effects of Workers Welfare Facilities on Productivity on Zambian Construction Work Sites – Case Studies

An assessment was carried out to ascertain the Effects of provision of workers Welfare facilities on Productivity on Zambian Construction work sites.

4.5.1 Construction Worksites with Welfare Facilities for Employees

Two case studies were carried out on two construction sites found with welfare facilities for employees. The sites considered involved the construction of a shopping Mall and a factory on the Copperbelt Province. These two sites were purposively sampled due to their suitability for the study as well as their proximity having considered time and financial limitations. For each of the site an assessment and study were carried out to determine how various trades' men accounted for their productive time (man hours) on site.

The average number of times (frequency) various employees sought for permission to go to the toilet as well as how long they took to resume the work was observed and calculated. Furthermore, the company's stipulated time for lunch was compared to actual time workers took so as to determine how much was lost unproductively. The sample size was five for each trade and these were randomly selected to avoid biasness.

4.5.1.1 Case Study One – Construction of a Shopping Mall

This project involved the construction of a shopping mall and the scope of works included; Earthworks, Civil and Building works. Professionals, Skilled, Semi-skilled and Unskilled (general) workers were employed on the project both from within and outside town. The contractor engaged had provided two conventional flushable toilets servicing the population of fifty-six (56) workers, the facilities were positioned within a distance of 50 to 75 metres from either ends. Furthermore, a sheltered cooking and eating area was provided for employees on site.

The process of data collection involved conducting structured interviews with three workers who had been actively on site for a period of not less than 2 months. Further, two site visits were conducted during which observations were made to assess the availability of facilities

as well as their proximity, number times employees sought for permission to go to the toilet and how long they took to resume the work, together with time lost during lunch.

The study revealed that out of the total 8 hours daily shift it took on average 13 minutes for an employee to resume work from the time permission was sought to go to the toilet. Further, that 4.8 minutes of the paid for productive time per person was lost daily either by going for lunch earlier than the company stipulated time or reporting back late from lunch as shown in table 4.2 translating to 1 hour 48 minutes a week.

4.5.1.2 Case Study Two – Construction of a Factory

The project involved the construction of a factory on the Copperbelt province of Zambia and the scope of works included among other things; Earthworks, Civil and Building works. Professionals, Skilled, Semi-skilled and Unskilled (general) workers were employed on the project both from within and outside town. The contractor had provided toilet facilities and eating facilities for employees on worksite. Six mobile portable toilets units were provided for the population of eighty three (83) employees the facilities were positioned within a distance of not more 100 metres from either ends. Additionally, a temporary kitchen and eating sheds were made available for workers within site.

Data collection involved conducting structured interviews with employees on site who had been actively on site for not less than 1 year. More so, a questionnaire was administered for triangulation purposes.

The study revealed that out of the total 8 hours daily shift it took 11 minutes on average for an employee to resume work from the time permission was sought to go to the toilet furthermore, that 3 minutes of the paid for productive time per person was lost daily either through going for lunch earlier than the company stipulated time or by reporting back late from lunch as shown in table 4.3 translating to 1 hour 22 minutes a week.

Table 4. 2: Average employees' unproductive time per day on a construction site in hours

Item No.	Description	Unit of measure	Expected Hours of work per day	Average time between seeking permission to go to the toilet and resuming of work	Time lost during lunch in a day	Average unproductive time per day	Commulative unproductive time per week
1	Bricklayer 1	Man hours	8	0.17	0.08	0.25	1.5
2	Bricklayer 2	Man hours	8	0.22	0	0.22	1.32
3	Bricklayer 3	Man hours	8	0.18	0.07	0.25	1.5
4	Bricklayer 4	Man hours	8	0.2	0.15	0.35	2.1
5	Bricklayer 5	Man hours	8	0.25	0.17	0.42	2.52
6	Steel fixer 1	Man hours	8	0.22	0	0.22	1.32
7	Steel fixer 2	Man hours	8	0.17	0.08	0.25	1.5
8	Steel fixer 3	Man hours	8	0.25	0.1	0.35	2.1
9	Steel fixer 4	Man hours	8	0.17	0	0.17	1.02
10	Steel fixer 5	Man hours	8	0.17	0.2	0.37	2.22
11	Painter 1	Man hours	8	0.33	0.13	0.46	2.76
12	Painter 2	Man hours	8	0.17	0	0.17	1.02
13	Painter 3	Man hours	8	0.2	0.08	0.28	1.68
14	Painter 4	Man hours	8	0.15	0	0.15	0.9
15	Painter 5	Man hours	8	0.42	0.16	0.58	3.48
16	Mean Average Total		8	0.22	0.08	0.30	1.80

Table 4. 3: Average employees' unproductive time per day on a construction site in hours

Item No.	Description	Unit of measure	Expected Hours of work per day	Average time between seeking permmission to go to the toilet and resuming of work	Time lost during lunch in a day	Average unproductive time per day	Commulative unproductive time per week
1	Bricklayer 1	Man hours	8	0.15	0.15	0.3	1.8
2	Bricklayer 2	Man hours	8	0.23	0	0.23	1.38
3	Bricklayer 3	Man hours	8	0.17	0	0.17	1.02
4	Bricklayer 4	Man hours	8	0.17	0	0.17	1.02
5	Bricklayer 5	Man hours	8	0.2	0	0.2	1.2
							0
6	Steel fixer 1	Man hours	8	0.13	0	0.13	0.78
7	Steel fixer 2	Man hours	8	0.2	0.17	0.37	2.22
8	Steel fixer 3	Man hours	8	0.15	0	0.15	0.9
9	Steel fixer 4	Man hours	8	0.23	0	0.23	1.38
10	Steel fixer 5	Man hours	8	0.3	0.1	0.4	2.4
							0
11	Painter 1	Man hours	8	0.17	0.12	0.29	1.74
12	Painter 2	Man hours	8	0.17	0	0.17	1.02
13	Painter 3	Man hours	8	0.15	0.17	0.32	1.92
14	Painter 4	Man hours	8	0.15	0	0.15	0.9
15	Painter 5	Man hours	8	0.17	0	0.17	1.02
							0
16	Mean Average Total		8	0.18	0.05	0.23	1.38

4.5.2 Construction Sites without Welfare Facilities for Employees

Further, two case studies were carried out on Construction worksites without workers welfare facilities in Ndola namely; Construction of the Health facilities as well as Drainage and Civil works roads project. These were purposively sampled. Assessment and studies were carried out to determine how various trades men accounted for their productive time (man hours) on a construction worksites. Similarly, the process of data collection was through participative observation as well as experience over a period of 10 weeks and 8 weeks respectively for the Health facility and Drainage/Civil works.

The average number of times (frequency) employees sought for permission to go to the toilet was observed and calculated. As well as the duration taken to resume the work from the time permission was sought. Furthermore, the company's stipulated time for lunch was contrasted against the actual time workers took so as to determine how much was lost unproductively.

4.5.2.1 Case Study Three – Construction of a Health Facility

This project involved the construction of a health facility with the scope of works being the general building works. The contractor engaged had employed thirty-one (31) workers both from within and outside town who included; Bricklayers, Steel fixers, Painters among other trades.

Lodging and sanitary facilities were provided for workers off site where as the actual construction worksite had neither toilets nor Kitchen/eating facilities. The nearest toilet facilities were approximately 300 metres offsite (at a place of lodging).

Data was collected through participative observation as well as experience over a period of 10 weeks. The study revealed that out of the total 8 hours daily shift it took on average 25 minutes for an employee to resume work from the time permission was sought to go to the toilet. More so, that on average 17 minutes of the paid for productive time per person was lost daily either through going for lunch earlier than the company stipulated time or by reporting back late from lunch as shown in table 4.4 translating into 4 hours 14 minutes a week. For the skilled workers the loss in productive time consequently impacted further on their respective helpers who had to wait for instruction before resuming the works.

4.5.2.2 Case Study Four – Drainage and Civil Works Project

The scope of works for this project included earthworks, disilting existing drains, construction of culverts, laying of kerbs, stone pitching as well as other associated works. Skilled, Semi-skilled and unskilled workers were employed from the surrounding communities.

The site was a mobile one with neither toilets (Portable mobile toilets) nor any kitchen/eating facility provided for workers. Forty-two (42) workers who had been employed had to make their own arrangements for lunch or toilets it is also important to note that the sites were surrounded by a densely populated residential area.

Data was collected through participated observation and experience during site visits over a period of 1 week. Out of the total 8 hours daily shift it took on average 29 minutes for an employee to resume work from the time permission was sought to go to the toilet. A further 24 minutes of the paid for productive time per person was lost daily, either through going for lunch earlier than the company stipulated time or by reporting back late from lunch as shown in table 4.5 translating into 5 hours 16 minutes a week cumulatively. Similarly, for skilled workers the loss in productive time consequently impacted further on their respective helpers who had to wait for instruction before resuming the works.

Table 4. 4: Average employees' unproductive time per day on a construction site in hours

Item No.	Description	Unit of measure	Expected Hours of work per day	Average time between seeking permission to go to the toilet and resuming of work	Time lost during lunch in a day	Average unproductive time per day	Commulative unproductive time per week
1	Bricklayer 1	Man hours	8	0.42	0.28	0.7	4.20
2	Bricklayer 2	Man hours	8	0.37	0.3	0.67	4.02
3	Bricklayer 3	Man hours	8	0.42	0.25	0.667	4.00
4	Bricklayer 4	Man hours	8	0.4	0.22	0.62	3.72
5	Bricklayer 5	Man hours	8	0.5	0.33	0.83	4.98
6	Steel fixer 1	Man hours	8	0.37	0.33	0.7	4.20
7	Steel fixer 2	Man hours	8	0.5	0.25	0.75	4.50
8	Steel fixer 3	Man hours	8	0.53	0.28	0.81	4.86
9	Steel fixer 4	Man hours	8	0.25	0.33	0.58	3.48
10	Steel fixer 5	Man hours	8	0.58	0.28	0.86	5.16
11	Painter 1	Man hours	8	0.5	0.27	0.77	4.62
12	Painter 2	Man hours	8	0.42	0.27	0.69	4.14
13	Painter 3	Man hours	8	0.37	0.3	0.67	4.02
14	Painter 4	Man hours	8	0.4	0.33	0.73	4.38
15	Painter 5	Man hours	8	0.27	0.28	0.55	3.30
16	Mean Average Total		8	0.42	0.29	0.71	4.24

Table 4. 5: Average employees' unproductive time per day on a construction site in hours

Item No.	Description	Unit of measure	Expected Hours of work per day	Average time between seeking permmission to go to the toilet and resuming of work	Time lost during lunch in a day	Average unproductive time per day	Commulative unproductive time per week
1	Bricklayer 1	Man hours	8	0.5	0.33	0.83	4.98
2	Bricklayer 2	Man hours	8	0.42	0.35	0.77	4.62
3	Bricklayer 3	Man hours	8	0.47	0.42	0.89	5.34
4	Bricklayer 4	Man hours	8	0.5	0.5	1	6
5	Bricklayer 5	Man hours	8	0.58	0.33	0.91	5.46
6	Steel fixer 1	Man hours	8	0.5	1	1.5	9
7	Steel fixer 2	Man hours	8	0.37	0.33	0.7	4.2
8	Steel fixer 3	Man hours	8	0.5	0	0.5	3
9	Steel fixer 4	Man hours	8	0.48	0.3	0.78	4.68
10	Steel fixer 5	Man hours	8	0.47	0	0.47	2.82
11	Painter 1	Man hours	8	0.67	0.5	1.17	7.02
12	Painter 2	Man hours	8	0.5	0.83	1.33	7.98
13	Painter 3	Man hours	8	0.33	0.42	0.75	4.5
14	Painter 4	Man hours	8	0.42	0.33	0.75	4.5
15	Painter 5	Man hours	8	0.5	0.33	0.83	4.98
16	Mean Average Total		8	0.48	0.40	0.88	5.27

4.6 Laws Protecting Workers Wellbeing on Construction Sites

4.6.1 Employees' familiarity with the laws providing for their wellbeing on construction sites.

The findings revealed that 38% of the respondents were familiar with the laws providing for construction workers wellbeing on site with 36% and 26% being not sure or familiar respectively as shown in figure 4.15. However, interviews with respondents revealed that most of those who indicated as being familiar or not sure had actually little or no knowledge of the laws providing for workers wellbeing on construction site.

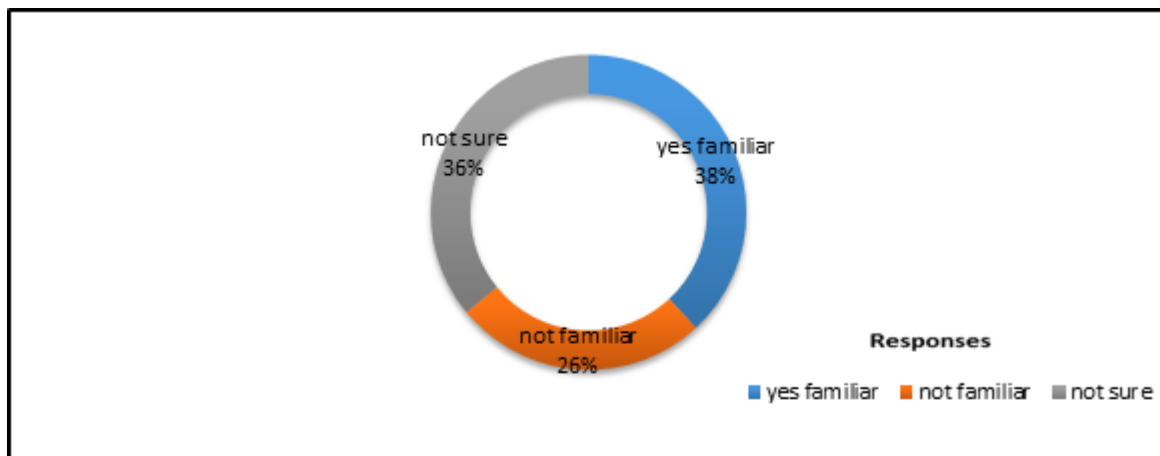


Figure 4. 15: Respondents familiarity with the laws on workers wellbeing.

4.6.2 The level of understanding among employees of rights pertaining to their welfare facilities on Zambian construction work sites.

The findings revealed that most of the respondents had little or no knowledge of laws pertaining to their welfare on Zambian construction work sites as shown in figure 4.16. Further interview engagement revealed that even those indicating to have average knowledge had actually little knowledge on certain Legislations while those claiming to be fair knowledgeable had average knowledge.

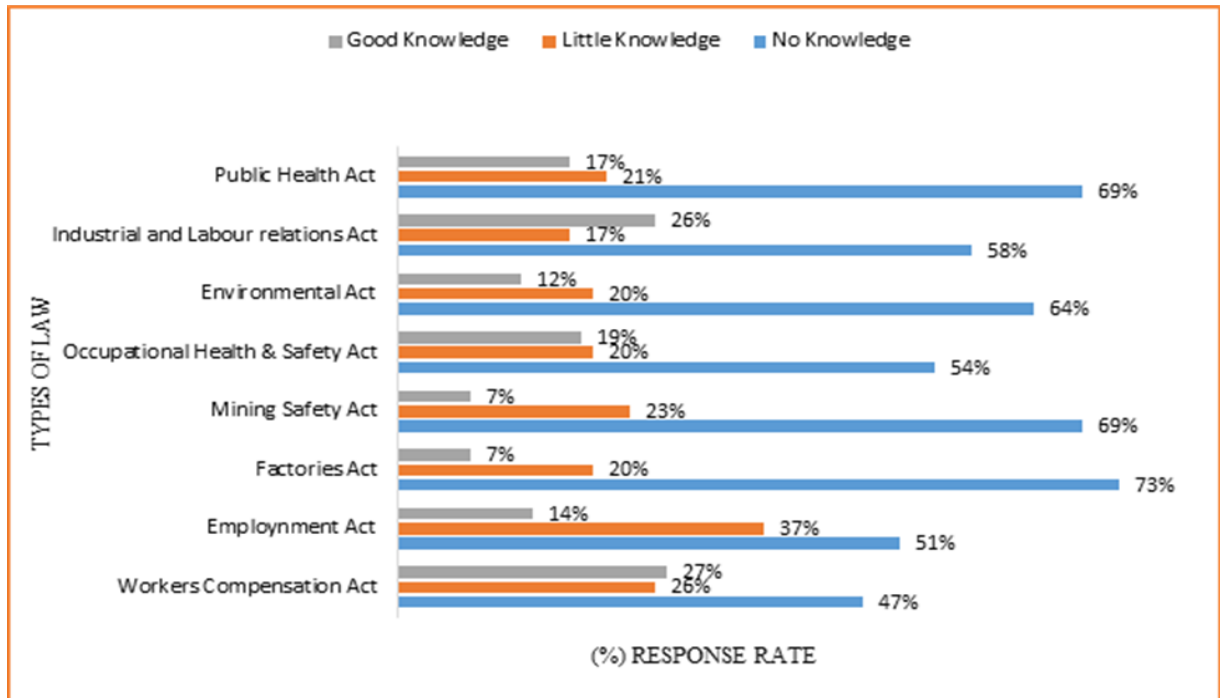


Figure 4. 16: Respondents level of knowledge on various laws pertaining to their wellbeing.

4.6.3 Application of the law relating to workers wellbeing on construction sites in the ZCI.

The findings among the respondents found with good knowledge of the law revealed lack or little application of the laws relating to workers wellbeing on Zambia construction sites as shown in figure 4.17.

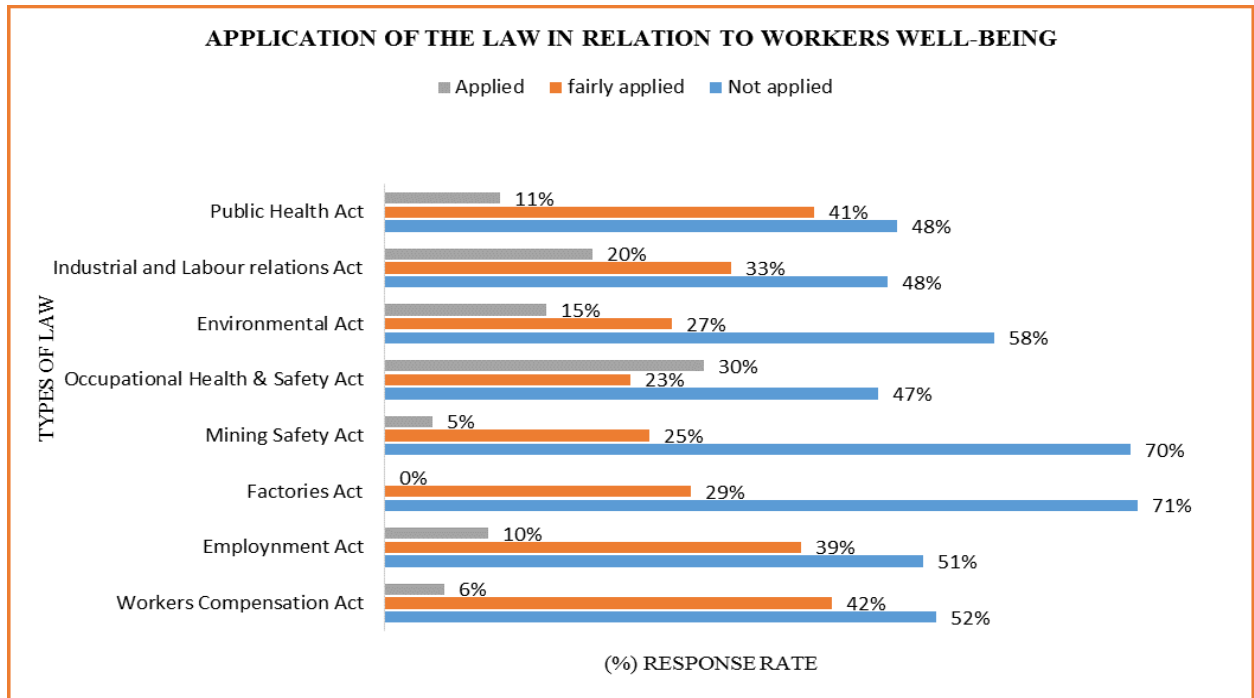


Figure 4. 17: Respondents assessment of level of application of various laws protecting employees on construction sites.

4.7 Conclusion

An evaluation of the provision of workers welfare facilities on construction, established that the current levels of provision of workers welfare facilities on Zambian construction work sites is low; with most contractors failing to provide appropriate toilet and washing facilities, rest-rooms and shelter, temporary housing, transport to and from place of work, a place to warm up and eat their food from as well as somewhere to store clothing.

This research further established that there is lack of familiarity with existing laws protecting workers wellbeing on Zambian construction sites among employers and workers. Most of the employers and employees have little or no knowledge of laws pertaining to their welfare on Zambian construction work sites.

Chapter Five: Discussion and Analysis

5.0 Introduction

This chapter discusses and analysis the findings in relation with the existing body of knowledge on the provision of welfare facilities in the general construction industry focusing on its relationship with labour productivity. Discussion of findings with literature was important in determining how this research fits in the existing body knowledge on the subject. It further provides a basis for comparison on how the research has contributed to the filling of the previous missing gaps in the body of knowledge. This was carried out in relation with the research objectives and questions.

5.1 Provision of Welfare Facilities on Construction Work Sites

5.1.1 Toilet facilities on Construction work sites

The research revealed that despite 72% of the surveyed contractors having provided toilet facilities for employees on Zambian Construction Worksites only 52% were made of either concrete conventional blocks or clay bricks, 8% were made of timber, 12% metal sheets, glass thatch 12%, empty sacks 2%, 4% were made from used card boards with 4% made from plastics. On sites where toilet facilities were provided workers were able to answer calls of nature in a short space of time as opposed to those not having such facilities on site. This is because where such facilities are not provided workers had to cover longer distances in search of facilities far from site or have to get to the nearby bushes. Some workers spoken to revealed that it was common for them or their colleagues to use the excuse of going to the toilet to avoid work and get some rest.

According to HSE (2010) “So far as is reasonably practicable the employer need to provide flushing toilets and running water, connected to mains water and drainage systems. If this is not possible, facilities with a built-in water supply and drainage tanks should be used. Portable chemical toilets are acceptable only if it is not reasonably practicable to make other

adequate provision. HSE (2010) further provides that toilets must be adequately ventilated, lit and maintained in a clean condition. This contradicts the research findings on Zambian construction worksites which are characterised by poor facilities.

5.1.2 Kitchen and Eating facilities on Zambian construction work sites

With reference to kitchen facilities, research established that only 35% of the projects surveyed had kitchen facilities provided for employees on construction sites. It was further revealed that 65% of the workers on Zambian construction work sites cook from either; any available shade within site, under a tree, open spaces or in unfinished building with wood while others leave the site for lunch. Among those going out for lunch others come back late or drunk suggesting that some went out for lunch to drink alcohol this negatively impacts on employees' dieting and subsequently their wellbeing.

Similarly, on the eating facility only 22% of projects surveyed had eating facility provided on site leaving worker vulnerable to heat exposure, sun, dust, which could result in diseases especially during the rain seasons.

5.1.3 Changing room and Ablution facilities for employees on Construction work sites

The research revealed that only 11% of the contractors surveyed had changing room facilities provided for workers on site. This meant some workers reported for work with a work suit on, while others change from the bush, nearby public facilities, toilets or where ever they could find privacy. However, the situation was even worse for sites found with female workers whose only option is to change from toilets.

According HSE (2010) "every site should have arrangements for securely storing personal clothing not worn on site and for protective clothing needed for site work. Men and women should be able to change separately. Separate lockers might be needed, although on smaller sites the site office may be a suitable storage area provided it is kept secure. Where there is a risk of protective site clothing contaminating everyday clothing, items should be stored separately". Factories Act (1965) of Zambia provides that adequate suitable accommodation of clothes not worn during working during hours should be provided.

On the ablution (washing) facilities the research revealed that only 21% of the contractors surveyed had provided such facilities on work sites. Furthermore, that 79% of the sites without such facilities had workers resorted to either using; the toilets, the bush, nearby public facilities or any hidden place around site. Using the bush or a toilet as an ablution is not health for employees as it puts them in danger of being bitten by a snake or catching sanitary related diseases respectively from the toilet. HSE (2010) provides that washing facilities “should include: a supply of clean hot and cold, or warm, water (which should be running water so far as is reasonably practicable); soap or other suitable means of cleaning; towels or other suitable means of drying; sufficient ventilation and lighting; sinks large enough to wash face, hands and forearms”. Similarly, (Factories Act, 1965) of Zambia provides washing that, “facilities shall be provided and be kept clean and in orderly condition, Soap must be provided”.

5.1.4 Provision of transport to workers on Zambian construction work sites

Only 32% of the contractors surveyed had transport provision for workers to and from construction work sites. The research further revealed that most of the employees reported for worksite on foot, with public transport, bicycles or begged for transport to and from site. On projects with transport provisions for workers, employees were reporting for work on time and refreshed, while on those project sites without transport arrangements, reports of reporting to work late and tired was the norm. Further, sites where workers had no transport facilities had workers wanting to leave the sites earlier than the knock off time to rush for the bus or catch a lift home thereby impacting negatively on productivity. According to Yamwamu et al, (2012) “poor transportation to and from work reduce workers’ productivity, and low productivity in turn reduces the capacity of the society to improve working conditions.”

5.1.5 First aid, safety and Lodging facilities for employees on work sites

On provision first aid, safety and lodging facilities 65% of the contractors surveyed had provided such facilities for employees on work site. According to ILO (2009) employers are responsible for ensuring that first aid, including trained personnel, is available at all times. Arrangements shall be made for ensuring the removal for medical attention of workers who have suffered an accident or sudden illness. Furthermore, interviews with respondents on sites where first aid and safety measure were available revealed that some workers even after being provided with Personal Protective Equipment (PPE) opted not to use them as they either had sold them or felt uncomfortable wearing them. Muiruri and Mulinge, (2014) opines that “culture and attitude of construction workers and the site supervisors about health and safety often condone risk taking and unsafe work practices”. According to Ajala (2012) “Poor and unsafe workplace environment, result in significant losses for workers, their families, and national economy. A conducive workplace environment that aid the performance of work automatically improves productivity”.

Additionally, on the lodging facilities research further revealed that where employees were not properly provided with conducive lodging facilities the morale was low thereby impacting negatively on productivity. Congenial environment provided for workers on site paves way for productivity, reduced site disputes, and promotes industrial peace (Bagul, 2014).

5.1.6 Provision of smoking Areas

Most workers on Zambian work sites smoke from wherever they wish as long as they are no flammable substances, others indicated that they smoke anywhere on site but away from fellow workers with very few indicating that they seek for permission to smoke off site as indicated by the findings.

Some workers interviewed indicated that cigarette smoke causes them flu as well as other respiratory discomforts. This assertion agrees with Deacon (2004) that “smoking is associated with lung cancer, cardiovascular disease, diabetes mellitus and most other respiratory diseases of a chronic nature. Furthermore, Phoon (2001) as cited in Deacon (2004)

states that “recent studies suggest that myocardial infarction is substantially more among manual and unskilled workers, although this is only partially explained by a relatively higher incidence of smoking in that specific group”.

5.1.7 Provision of Resting Facilities.

According to the findings only 14% of the contractors surveyed had provided resting facilities on site for employees as suggesting poor provision of resting facilities on construction worksites. The research further revealed that in case of rains, excessive sun, lunch time or resting time employees resort to using either; any available shade on site, unfinished buildings, under trees or anywhere they can find shelter. The HSE (2010), opines that rest facilities should provide shelter from wind and rain. It further states that these facilities should have adequate numbers of tables, seating with backs, and access to water. According to the HSE (2010), rest areas are not to be used to store plant, equipment or materials.

As a result of failure to provide for such facilities, some workers on Zambian sites tended to go far from site to where they can get good rest hence resulting in late return to work and sometimes even drunk hence slowing down productivity.

5.2 Effects of prolonged Exposure to Sunlight on Workers wellbeing on Sites

The findings revealed that only 41% of the contractors had cool drinking water provided for employees on site. According to Worksafe (2012) cool drinking water should be provided near the work site and that during hot weather, workers should be encouraged to drink a cup of water, and not rely solely on soft drinks or caffeinated drinks. The results suggest that most workers on Zambian construction are not provided with cool drinking water leaving them vulnerable to dehydration effects. Dehydration occurs through heavy sweating and moist skin, this causes weakness and fatigue, nausea, vomiting, headache and giddiness as well as reduced blood flow to the brain which may lead to fainting (OHSA, 2014).

Furthermore, the research established that only 2% of the contractors surveyed used light coloured and loose fitting clothes as a safety measure for employees during the periods of prolonged exposure to thermal radiation (hot season). OSHA (2014) opines protection against ultraviolet exposure, through providing personal protective equipment (PPE) such as wide brim hat, loose fitting, long-sleeved collared (preferably cotton) shirt and long pants, sunglasses and sunscreen.

On provision of extra rest breaks, the findings revealed that only 7% had considered breaks as a safety measure for employees' when exposed to prolonged thermal radiation. Worksafe (2012) opines providing extra rest breaks in a cool shade as a safety measure. More so, according to HSE (2010), rest facilities should provide shelter from sun, wind and rain. It further states that these facilities should have adequate numbers of tables, seating with backs, and should not to be used to store plant, equipment or materials.

The results of this research suggest that most employees on Zambian construction sites are excessively exposed to sunlight especially during the hot season. Leithead and Lind (1964) asserts that "excessive exposure to the sun results in hot, dry skin and rapidly rising body temperature can lead to collapse, loss of consciousness, convulsions, even death. Aggravation of other medical conditions and illnesses such as high blood pressure or heart disease due to increased load on the heart as well as reproductive disorders through affected sperm count or the health of the foetus".

5.3 Effects of Welfare Facilities on Productivity- Case Studies

From the four case studies it was established that employees' wages were calculated on man hourly basis through the use of time cards or log sheets. This suggests that one way of measuring employees' productiveness considers the accumulated man hours. According to Attar et., al (2012) "Construction productivity is defined as the quantity of work produced in a given amount of time by a worker or a specific crew, that is, the quantity of construction output units produced in a given amount of time or a unit time." One of the formulas for calculating productivity output per man hour is as follows: Construction productivity = quantity of work produced / time duration.

The inverse of labour productivity, man- hours per unit (unit rate), is commonly used in measuring productivity hence its consideration is justifiable in this research. Therefore, in comparing the four case studies this research established that on sites where toilet facilities were provided, workers were able to answer calls of nature in a short space of time as opposed to those not having such facilities on site. However, sites where such facilities were not provided workers had to make longer distances in search of facilities far from site or have to get to the nearby bushes. Some workers spoken to revealed that it was common for them or their colleagues to use the excuse of going to the toilet to avoid work and get some rest. They usually took longer periods of time when answering the call of nature hence cumulatively reducing on productive time.

The research further revealed that absence of one employee from worksite through time spent in search of toilet facilities somewhere off site can have spiral effects on productivity in that; if for example a brick layer who is supposed to lay 13 blocks per hour losses half an hour looking for a toilet it firstly results in loss of production output from the brick layer as well as helpers who assists with the mixing of mortar and carrying of blocks. This is similar for other trades.

Additionally, lack or provision of kitchen and eating facilities on Construction worksite impacts on productivity as suggested by results in all the four case studies considered. This is because on sites where such facilities were not provided; there was loss of production time by the workers if allowed to go out of site for lunch as some tend to report back for work late. This was evident on sites where toilet, kitchen and eating facilities were provided for employees that on average only between 1 hour 23 minutes to 1 hour 48 minutes was the total time cumulatively in a week from the moment an employee sought for permission to go to the toilet to resuming work as well as lost during lunch time respectively in a week compared to between 4 hours 14 minutes to 5 hours 16 minutes for Construction worksites without such facilities. This indicates that lack of welfare facilities led to loss of productive time which the company was still paying for through accumulated man hours.

Similarly, research revealed that others workers if allowed off site for lunch usually returned back drunk. A drunk employee usually does not perform at his optimum thereby reducing on their efficiency hence affecting productivity. Furthermore, the research revealed that lack of eating facilitates on site impacts negatively on productivity in that some workers tend to give excuses of going off site to get food thereby suspending the works. Others workers tend to eat from anywhere they can find shade thereby leaving them vulnerable to heat exposure, sun and dust which could result in diseases especially during the rain seasons opposed to projects with such facilities. Low levels of hygiene in areas where workers where eating from were a recipe for diseases consequently impacting on productivity. In a related study on critical review of literature on employee wellness programs in Kenya, Ngeno and Muathe (2014) asserted that “hygiene factors when absent demotivates employees, but when present, does not cause any remarkable increase change in motivation. Further, Herzberg says that if the motivational factors are met, the employee becomes motivated and hence performs higher”.

5.4 The Understanding and Application of the Laws Protecting Construction Workers Welfare on Zambian Work Sites

The research established that most of the respondents on Zambian construction work sites had little or no knowledge of laws pertaining to their wellbeing on site. Interviews suggested lack of knowledge to be among the reasons for poor provision of welfare facilities on Construction worksites. This agree with Muiruri and Mulinge (2014) that “lack of proper information and ignorance are to blame for the poor safety or welfare measures on construction sites.”

Furthermore, most the respondents found with good knowledge of the law indicated that the law relating to workers wellbeing on Zambia construction sites is either little or not applied on most site. More so, that there is lack of inspections from the relevant enforcing agencies, making it easy for contractors to default. According to ILO (2012) “lack of familiarity with existing Occupational Safety and Health (OSH) frameworks among employers and workers has been identified as one of the main causes of low rates of compliance.”

5.5 Sustainable Employees' Work Environment

Employees spend a large portion of their lives at work each day. Therefore, ensuring their wellbeing through provision of welfare facilities, a healthy and sustainable work environment helps to promote productivity and create a culture of employees that value the health of their surroundings. According to the Danish Trade Union Movement's Centre for Competence Development (2004) "an activity can be characterized as sustainable if it helps move the workplace towards; Improving health & safety at work through prevention of both physical and psycho-social working environmental problems. Furthermore, Centers for Disease Control and Prevention (2012) provides that worksite wellness programs can improve employee satisfaction, reduce stress, decrease absenteeism, increase productivity thereby promoting a sustainable workplace.

5.6 Conclusion

The findings of this research agrees with existing literature which states that work in the construction industry involves much manual or physical activity. It further asserts to the fact that the work is most hazardous and vulnerable because of poor employment conditions characterised by lack of basic amenities and inadequacy of welfare facilities. These assertions are based on the findings which revealed that the current levels of provision of workers welfare facilities on Zambian construction work sites is poor with most contractors failing to provide the basic welfare amenities such as toilets, ablutions, Kitchens, and Lodging.

The research further established that there exists somewhat a kind of relationship between labour productivity and employee welfare benefits as well as facilities. On sites found with welfare facilities the workforce was highly motivated which resulted in increased labour productivity contrary to site without welfare facilities. It is important to note that naturally welfare facilities may not directly relate to an employee's job however the presence or absence of the facilities is notable through employee performance, attitude, high or low labour turnover.

More so, little or no knowledge of the law protecting employees and their wellbeing on construction sites among was identified as the main cause for non-compliance Construction Worksites in the Zambian construction industry both among the management staff as well as the unskilled workers.

Chapter Six: Conclusion and Recommendations

6.1 Introduction

Chapter six essentially gives the conclusion and recommendations of the study. The preceding chapters have expanded on the importance and need of evaluating construction workers welfare facilities for construction workers on site and its effect on productivity in the Zambian construction industry. Various literature sources have been reviewed focusing on challenges encountered by workers in relation to the provision of welfare facilities on Construction Sites, identifying factors leading to poor welfare facilities as well as critically analysing how workers welfare facilities impacts on productivity. This was done so as to draw valuable reason relative to the Zambian construction industry (ZCI).

This final chapter aims at outlining the conclusions from the research carried as well as making appropriate recommendations on the challenges affecting the provision of workers welfare facilities on Zambian construction sites there by improved welfare measures and productivity in the Zambian construction industry. The first part gives a recapitulation of the whole study followed by reviewing of research questions. Then the last part offers the conclusion as well as recommendations with regards to the problems identified from the research findings and analysis before suggesting an area for further research.

6.2 Chapter Recapitulation

This thesis is divided into six chapters. Chapter one introduced the whole study on Evaluation of workers welfare facilities and its effect on productivity in the Zambian construction industry (ZCI). It provided the justification, outlined the research problem, stated research objectives as well as significance of the study to the ZCI. It also stated the research questions, scope and relevance of the study. And in meeting the set out objectives the following chapters were discussed.

Chapter two met the second, fourth and fifth objectives which aimed at; evaluating the challenges encountered by workers in relation to the provision of welfare facilities on

Construction Sites, identifying factors leading to poor welfare facilities as well as noncompliance on Zambian Construction sites as well as critically analysing how workers welfare facilities impacts on productivity on Zambian Construction sites.

The third chapter discussed the methodology adopted for this research, this was accomplished by firstly discussing the research approach, design and target population, thereafter, the sample size was discussed as well as the sampling process and justifications employed this was important in ensuring representativeness of the research population methods of data collection and instruments used were discussed as well as research methodological reliability and validity.

Having laid the basis for the study chapter four presented the actual findings as obtained from the interviews and questionnaires administered to relevant research samples. This was to satisfy the first, third and fifth objectives research objectives which were aimed at assessing the level of provision of welfare facilities on Zambian Construction Sites, investigating the awareness levels of the law protecting workers wellbeing on construction sites among employers and employees relative to its application on Zambian Construction Sites. Lastly, an analysis of how workers welfare facilities impacts on productivity on Zambian Construction sites was conducted.

Chapter five discussed and analysis the findings in relation with the existing body of knowledge on the subject matter which evaluated the provision of employees' welfare facilities on Zambia Construction Worksites and its effects on labour productivity.

This final chapter provides the conclusion and recommendations based on the findings and analysis of the research relative to the existing literature on the subject.

6.3 Research Questions Review

6.3.1 How is the provision of welfare facilities on Zambian Construction sites?

Zambia, like many other developing countries, has facilities for workers at construction sites that are generally poor. the current levels of provision of workers welfare facilities on Zambian construction work sites is low; with most contractors failing to provide appropriate toilet and washing facilities, rest-rooms and shelter, temporary housing, transport to and from

place of work, a place to warm up and eat their food from as well as somewhere to store clothing.

6.3.2 What are some of the challenges encountered by workers due to lack of provision of workers welfare facilities?

There are several factors affecting construction workers due to lack of proper welfare facilities on construction sites. Working in harsh circumstances and living in unhygienic conditions makes them to suffer from serious occupational health problems and vulnerable to diseases this may lead to subsequent death and injury. More so, children living on construction sites often suffer from malnutrition, under nourishment, accidents, and innumerable health problems. The absence of clean drinking water and flush latrines causes cholera and other diseases to spread quickly, and some employees suffer from coughs caused by inhaled paint fumes and cement particles.

Furthermore, some musculoskeletal injuries result in permanent injuries that can have a significant impact the person's working ability, and quality of life.

6.3.3 What are the factors leading to poor provision of workers welfare facilities as well as non-compliance to the existing law on workers wellbeing on construction sites?

Lack of familiarity with existing Occupational Safety and Health (OSH) frameworks among employers and workers has been identified as one of the main causes of low rates of compliance. This is due to the fact that most employers in the sector view OSH as a cost rather than an investment and thus pay very little attention to either its legal provisions or promotional aspects. More so, lack of proper information and ignorance are to blame for the poor safety measures on construction sites, some workers feel that the safety equipments are too cumbersome and uncomfortable. The culture and attitude of construction workers and the site supervisors about health and safety often condone risk taking and unsafe work practices.

Furthermore, inadequate enforcement mechanisms, absence of safety and health committees, poor maintenance of personal protective gear, unawareness of welfare and safety matters among the workers on the construction sites as well as lack of top management support in

the management of health and safety on construction sites are other factors which lead to poor provision of workers welfare facilities on construction sites. Similarly, enforcement of health and safety regulations remains a problem mainly because of lack of adequate resources available to government institutions responsible for occupational health and safety administration.

Lastly, the study reviewed that high competition forces contractors to bid projects with minimum profits in order to stay in business thereby compromising on issues of workers welfare, health and safety.

6.3.4 How much knowledge do employees and employers (contractors) have on the existing laws protecting workers wellbeing on Zambian Construction sites?

This research established that there is lack of familiarity with existing laws protecting workers wellbeing on Zambian construction sites among employers and workers. Most of the employers and employees have little or no knowledge of laws pertaining to their welfare on Zambian construction work sites. Furthermore, those claiming to have average knowledge have in fact little knowledge on certain Legislations with those indicating to be knowledgeable having average knowledge.

6.3.5 How does provision of workers welfare facilities impact on productivity on Zambian Construction Worksites?

The research established that there exists somewhat a kind of relationship between labour productivity and employee welfare benefits as well as facilities. Poor standards of living, bad health, lack of education, bad housing, poor transportation to and from work, bad conditions in the work place reduce workers' productivity, and low productivity in turn reduces the capacity of the society to improve working conditions, most especially housing, transportation, food and health facilities could substantially improve the workers' productivity.

On sites found with welfare facilities the workforce was highly motivated which resulted in increased labour productivity contrary to site with poor welfare facilities. It is important to note that naturally welfare facilities may not directly relate to an employee's job but the

presence or absence of the facilities is notable through employee performance, attitude, high or low labour turnover.

6.4 General Conclusion

Conclusions made in this chapter are derived from the literature review, data collected and analysed in the previous chapters in relative to the research objective. The following conclusions are made based on the results of the study:

- i. An evaluation of the provision of workers welfare facilities on construction, established that the current levels of provision of workers welfare facilities on Zambian construction work sites is low; with most contractors failing to provide appropriate toilet and washing facilities, rest-rooms and shelter, temporary housing, transport to and from place of work, a place to warm up and eat their food from as well as somewhere to store clothing. From the total number of contractors surveyed only 35% had kitchen facilities provided for employees on site while as 21% and 14% had ablution as well as resting facilities respectively.
- ii. The literature review evaluated the challenges encountered by employees in relation to the provision of welfare facilities on Construction Sites. From literature the research established the following challenges; the construction industry has a poor reputation for, inter alia, being an unhealthy industry to work in, this is due to the fact that its rate of work related illness is one of the highest of all industries, workers are exposed to more H& S risks than other industries. The assortment of hazards that the construction workers are exposed to include permanent disabling injuries, loss of employment and income. Furthermore, the indirect costs suffered by employees affect their families as a result of a loss of the household, “bread winners” and increased dependence on government supports and grants, workers are often exposed to unsatisfactory working conditions on construction sites.
- iii. In identifying the factors leading to poor welfare facilities as well as non-compliance on Zambian Construction sites. The research revealed that lack of familiarity with existing legislation on workers welfare among employers and workers is one of the main causes of low rates of compliance. This agrees with existing literature that most employers in the sector view OSH as a cost rather than an investment and thus pay very little attention to either its legal provisions or promotional aspects. More so, that lack of

enforcement mechanisms such as site inspections to check adherence to health and safety requirements on construction work sites is another challenge.

- iv. The low awareness levels of the law protecting workers wellbeing on construction sites among both the management staff and the unskilled workers, was identified as the main cause for its little or non-application on construction sites in the Zambian construction industry. However, this was more evidenced on construction sites run by Chinese contractors who lacked essential local knowledge of the laws protecting employees. 38% of the respondents were familiar with the laws providing for construction workers wellbeing on site with 36% and 26% being not sure or familiar respectively.
- v. Critical analysis on how workers welfare facilities impacts on productivity on Zambian Construction sites. The research established that poor welfare facilities on construction sites impact negatively on productivity thereby agreeing with the fact that Construction workers need appropriate workplace amenities and facilities. The provision of appropriate workplace amenities and facilities is important for the basic health, safety and welfare of employees. This is because welfare measures provided by the employer will have immediate impact on the physical and mental efficiency alertness, morale and overall efficiency of the worker and thereby contributing to the higher productivity. This was evident on sites where toilet, kitchen and eating facilities were provided for employees that on average only between 1 hour 23 minutes to 1 hour 48 minutes was the total time cumulatively in a week from the moment an employee sought for permission to go to the toilet to resuming work as well as lost during lunch time respectively in a week compared to between 4 hours 14 minutes to 5 hours 16 minutes for Construction worksites without such facilities.

6.5 Recommendations

- 1.) In address the challenges identified in this research relative to the poor provision of workers welfare facilities relevant law enforcing agencies should be proactive by conducting regular site inspections to check on contractors' compliance to workers welfare, health and safety regulations on construction job sites.
- 2.) When evaluating the bids submitted by contractors' cost allocated to provision of provision of workers welfare facilities and safety in the bills of quantities should be well

defined and evaluated competitively by professionals responsible. Lastly, employers and contractors should draw suitable programmes that are consistent with laws governing the workers Act.

- 3.) Relevant enforcing agencies should considered introducing continuous short intensive courses aimed at educating contractors with relevant knowledge of the law protecting workers welfare, safety and health on sites. This is important due to the fact that lack of familiarity with existing welfare laws, Occupational Safety and Health frameworks among employers and workers was identified as one of the main causes of low rates of compliance. This will improve the situation especially that most employers in the sector view OSH as a cost rather than an investment and thus pay very little attention to either its legal provisions or promotional aspects
- 4.) Government enforcing agencies should introduce and emphasis on the importance of inductions courses focusing on workers' health and safety regulations among the construction workforce on site relevant to their occupation. This is important in addressing the low levels knowledge exhibited among employees on site especially that lack of proper information and ignorance are to blame for the poor safety measures in construction sites.
- 5.) The curriculum at tertiary level should include courses aimed at imparting students with relevant legal requirements in their occupation.

6.6 Area for Further Research

- Effects of poor welfare facilities on employees' health on Zambian Construction Sites.

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APPENDIX

SURVEY QUESTIONNAIRE

**DEPARTMENT OF CIVIL AND ENVIRONMENT
ENGINEERING**

SCHOOL OF ENGINEERING

THE UNIVERSITY OF ZAMBIA

RESEARCH TOPIC:

AN EVALUATION OF CONSTRUCTION WORKERS WELFARE FACILITIES ON
CONSTRUCTION SITES AND ITS EFFECT ON PRODUCTIVITY IN THE ZAMBIAN
CONSTRUCTION INDUSTRY

The information in this questionnaire shall be used solely for academic purposes and will be treated in strict confidence.

Please answer all questions. Choose only appropriate answer(s) by ticking or explaining where necessary.

A. GENERAL INFORMATION

i. In which grade is your firm registered?

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
Building works						
Civil/Drainage works						
Road Works						

ii. Profession of respondent

Construction Manager	Quantity Surveyors	Engineers	Architects	Business Managers	Others (specify)
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iii. Position of respondent within the firm

Site Engineer	Site Foreman	Site clerk	Skilled worker	Unskilled worker	Others (specify)
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iv. Duration for production worked on.

	Project 1	Project 2	Project 3	Project 4	Project 5
Less than 1 month					
1 to 3 months					
3 to 6 months					
6 to 12 months					
more than 12 months					

B. WELFARE FACILITIES

- i. Are the workers provided with the following facilities on construction site?

	Yes	No
Toilets		
Kitchen		
Eating area		
Change rooms		
Ablution		
Smoking areas		
Resting facility		
Transport to and from site		
Safety and first aid facilities		
Lodging facilities when working more than 45km from home		
Personal protective wear (PPE)		

- ii. What type of structures are the following facilities used on construction site made of?

	Kitchens	Eating area	Change room	Toilet	Resting area	Lodging facilities
Prefabs						
Brick/blocks						
Timber						
Metal sheets						
Flush portables						
Glass thatch						
Empty sacks						
Card Boards						
Plastics						
Tents						
Caravans						
If other specify						

- iii. On a scale of 1 to 5, where 1 mean within 10m, 2 within 20m, 3 within 50m, 4 within 100m and 5 more than 100m. What is the distance of the following facilities from the actual construction site?

	1	2	3	4	5
Toilets					
Kitchen					
Eating Area					
Changing room					
Ablution					
Smoking areas					
Resting area					
Lodging					
Nearby Bush					

- iv. How often are the following facilities used on construction site cleaned?

	none	Once a day	Twice a day	Once a week	Twice a week	> three times a week
Toilets						
Kitchen						
Eating Area						
Changing room						
Ablution						
Smoking areas						
Resting area						
Lodging						

- v. Using a scale of 1 to 5, where 1 means very poor and 5 very good how would you rate the condition of the following facilities being used on construction site?

Very poor  Very good

	1	2	3	4	5
Toilets					
Kitchen					
Eating Area					
Changing room					
Ablution					
Smoking areas					
Resting area					
Lodging					

- vi. Where the following facilities are not provided on construction site, what do workers use?

Options	Facilities	
	Kitchen	Eating Area
Any available shade on site		
Unfinished building on site		
Under a tree		
Anywhere around the site		
Open space		
If other specify		

- vii. Where the following facilities are not provided on construction site what do workers use?

Options	Facilities	
	Change rooms	Ablution
The bush		
Nearby Public facility		
Toilet facility		
Any hidden place around the site		
If other specify		

B - 1. TOILETS

- i. What do workers on site use as toilets?

The bush	
Nearby Public facility	
Drive to the nearest toilet facility	
Flushable conversional toilets	
Pit latrines	
Portable chemical toilets	
Enviro low (Dry composite toilet)	
If other specify	

- ii. Are there female workers on Site?

Yes	No
-----	----

iii. Are the toilet facilities provided for both

Yes	No
-----	----

 gender

iv. Do female workers use the same toilet facilities with male workers

Yes	No
-----	----

v. If they use the same facility how do you ensure privacy for the female workers

Cough when hear somebody approaching	
The is somebody on standby to inform others	
Lock the door using the locking mechanism provided	

vi. Where toilets are shared how do you take care of other sanitary needs for female workers?

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vii. If there are no sanitary facilities and toilets reserved for females, how do they attend to other personal needs?

They use the bush	
Nearby Public facility	
Drive to the nearest toilet facility	
Anywhere around the site	
If other specify	

viii. Do workers find it easier to stay away from work when they have issues which require frequent use the toilet such as stomach upsets?

Yes	No
-----	----

ix. How often do the workers excuse themselves to go to the toilet whether the facility is provided or not?

Once a day	
Twice a day	
Three times a day	
More than five times	
If other specify	

- x. How long do workers take when they excuse themselves to use the toilet?

Less than 5minutes	
5 to 10minutes	
10 to 15minutes	
15 to 20minutes	
More than 20minutes	

B – 2. SMOKING AREAS/ZONES

- i. Is smoking allowed on construction site
- | | | |
|-----|----|----------|
| Yes | No | Not sure |
|-----|----|----------|

- ii. Where do people smoke their cigarettes from on site?

Anywhere around the site	
Get permission to smoke off site	
Anywhere on site but away from fellow workers	
If other specify	

B – 3. RESTING FACILITIES

- i. Where do workers rest from during times of; rains, lunch, etc.

Any place within site with a shade	
Nearby Public facility	
Under a tree	
Within the unfinished building	
If other specify	

- ii. Are workers requested to leave site during lunch time?

Yes	No	Not sure
-----	----	----------

B – 4. TRANSPORT AND WORKING HOURS

- i. What mode of transport is available to workers if not provided?

By Public transport	
Using a bicycle	
Hiking/begging for any available transport	
Walking on foot	
If other specify	

- ii. How long do you take to move from home/lodging facility to worksite?

Less than 10minutes	
10 to 20minutes	
21 to 40minutes	
41 to 60minutes	
More than 60minutes	

- iii. In case of rains do workers find it easy to stay away or report late for work?

Yes	No	Not sure
-----	----	----------

- iv. What common reasons do workers give for absenteeism/staying away from work?

Excuse of rains	
Sickness	
Attending funeral	
Delayed payments	
Lack of Safety wear	
If other specify	

- v. What is the duration for working hours on a full working day?

8 hours	
9 hours	
10 hours	
11 hours	
12 hours	
If other specify	

- vi. If you work shifts, how long is each shift?

8 hours	9 hours	10 hours	11 hours	12 hours	If other specify
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- vii. Is there lunch break,

Yes	No
-----	----

- viii. How long is the lunch break?

Not more than 30minutes	
30 to 60minutes	
More than 60minutes	
If other specify	

- ix. How many days do you work in a week?

7 days	
6 days	
5 days	

B – 5. FIRST AID

- i. If there are is no safety or first aid on site what do you do in case of an accident?

Rush to medical Centre	
Asked to go home	
Attended to on site using first aid	
Employee loses job	
If other explain	

- ii. Does management know the acceptable temperature for workers to work on site?

Yes	No	Not sure
-----	----	----------

- iii. What are the common complaints resulting from excessive sun (heat) by construction workers on site?

Rashes on skin	
Itchiness and skin dryness	
Deterioration of the skin	
Premature ageing	
Sunburn	
Damage to the eyes	
Skin cancer	
Loss of skin elasticity	
Heat exhaustion	
Fainting	
Headache	
Thirst	
Dizziness	
Heat stroke	

- iv. From the list provided which safety measures are included when workers are working on site exposed to high temperature and heat?

Provide sufficient cool drinking water	
Encourage workers to take plenty water to replenish the body fluids lost through sweating	
Enable workers to cool down and reduce their exposure to hot environment through taking regular breaks and rotating duties and worksites;	
Make arrangements for workers to rest in cool or shady place during hot periods;	
Provide shower and washing facilities for washing and external cooling;	
Encourage workers to keep their shirt or other top on and to wear clothing that is light-colored and loose-fitting	
Use of naturally ventilated helmet	
Workers allowed to work with targets (umugwazo)	
If other specify	

B – 6. LODGING

- i. Where do workers lodge from?

Rent a house in the nearby communities	
Relatives or friend's place nearby	
Create makeshift structures around the site	
At a lodge, guest house or hotel paid for by the contractor	
If other specify	

- ii. How accessible (distance) is the lodging facility from the actual construction work site?

1 to 5km	
5 to 10km	
10 to 15km	
15 to 20km	
20 to 30km	
>30km	

C. EMPLOYEES WELFARE IN RELATION TO PRODUCTIVITY

- i. Using a scale of 1 to 5, Where 1 mean strongly disagree while as 5 mean strongly agree. In your own opinion does the provision of the following facilities on construction site impact positively on productivity?

	1	2	3	4	5
Toilets					
Kitchen					
Eating Area					
Changing room					
Ablution					
Smoking areas					
Resting area					
Lodging					
Transport for workers					
Health and Safety					

- ii. Give reason for your answer in (i)

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- iii. Using a scale of 1 to 5, Where 1 mean strongly disagree while as 5 mean strongly agree. In your own opinion does the lack of the following facilities on construction site impact negatively on productivity?

	1	2	3	4	5
Toilets					
Kitchen					
Eating Area					
Changing room					
Ablution					
Smoking areas					
Resting area					
Lodging					
Transport for workers					
Health and Safety					

- iv. Give reason for your answer in (iii).

.....

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D. EMPLOYEES' RIGHTS

- i. Are you familiar with the law which provides for Workers well-being on Construction site?

Yes	No	Not sure
-----	----	----------

- ii. How would you rate your understanding of the employees' right in relation to the following on Construction Site?

	No Knowledge	Below average	Average	Above average	High Knowledge
Workers Compensation Act 1999					
Employment Act, cap 268					
Factories Act, cap 441					
Mining Safety Act					
Occupational Health & Safety Act 2010					
Environmental Management Act 2011					
Industrial and Labour relations Act, cap 269					
Public Health Act, cap 295					

- iii. How did you get to know about the law on Construction workers well-being on site?

	Own Reading	From somebody	From school	On site	If others Specify
Workers Compensation Act 1999					
Employment Act, cap 268					
Factories Act, cap 441					
Mining Safety Act					
Occupational Health & Safety Act 2010					
Environmental Management Act 2011					
Industrial and Labour relations Act, cap 269					
Public Health Act, cap 295					

- iv. How would you rate the application of the law on employees' well-being in to the following on Construction site?

	Not applied	Little	Fairly applied	Above average	Fully applied
Workers Compensation Act 1999					
Employment Act, cap 268					
Factories Act, 441					
Mining Safety Act					
Occupational Health & Safety Act 2010					
Environmental Management Act 2011					
Industrial and Labour relations Act, cap 269					
Public Health Act, cap 295					

Thank You