An Examination of Occupational Health and Safety Management Practices in Selected Construction Sites of Lusaka City

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Abstract: **The purpose of this study was to investigate occupational health and safety management (OSH) practices in selected construction sites of Lusaka city. The study was guided by the following objectives: to identify safety and health hazards in selected construction sites of Lusaka city, to examine challenges that workers face in terms of occupation health and safety management in selected construction sites of Lusaka city, to ascertain occupational health and safety management measures put in place in selected construction sites of Lusaka district, and to suggest sustainable mitigation measures that could be put in place to improve occupational health and safety management practices in construction sites of Lusaka city. Semi-structured interviews and observations were conducted with 30 participants which comprised 7 employers, 4 sub-contractors and 19 employees. The findings of the study showed that workers in selected construction sites of Lusaka city faced many challenges with occupational health and safety management which negatively affected the way they worked. Most participants explained the challenges they faced such as communication barrier, lack of safety officers, lack of sanitary conveniences, inadequate proper personal protective equipment and lack of safety rules and regulations adherence by workers. The study concluded that occupational health and safety management practices at selected construction sites of Lusaka city were poor and this brought about injuries among workers. OSH management practices at sites would be more effective if government inspected construction sites and assessed if they were complying with safety and health rules and regulations.**

Key words: **Occupation health and safety, construction site, Lusaka city**

I. INTRODUCTION AND BACKGROUND OF THE STUDY

Construction is an important sector that contributes greatly in the economic growth of every nation. The construction sector provides job opportunities and contributes to the Gross Domestic Product (GDP) growth of every nation. It creates jobs, drives economic growth, and provides solutions for social, political, climatic and energy challenges. The growth of the construction industry also creates investment opportunities across related sectors.

Like any other country, the construction sector also plays an important role in the economic development of Zambia. According to the Times of Zambia of 26th January, 2016, building and construction has been the largest industrial sector of Zambia comprising 27.5 per cent of the Growth Domestic Product (GDP) with a growth rate of 12 per cent in 2014. The construction sector in Zambia has in the recent past recorded massive growth due to the increase in development projects initiated by the government and the private sector. The Zambia real estate and construction sector grew by 9.5 and 9.1 per cent in 2013 and 2014, respectively (Times of Zambia, 26th January, 2016). Not only has the sector contributed to the country's economic growth, it has also promoted the growth of other sectors such as logistics, wood, steel, cement and lime. According to the Zambia Development Agency (ZDA), the country recorded US$3.3 billion in Foreign Direct Investments mainly in the construction sector in 2014. The sector has in the recent past recorded massive growth in the development of modern infrastructure such as shopping malls, stadia, hospitals, schools and industries.

Despite the foregoing importance of the construction industry in Zambia and other countries, the sector comes with certain challenges too. The construction industry usually experiences accidents and life threatening risks. People who work at construction sites are routinely exposed to hazardous working conditions that put them at risk of suffering injuries related to falls, machinery and structural collapses.

As Zambia develops its infrastructure such as roads, shopping malls, schools and hospitals among others, accidents are likely to occur at the construction sites if workers and community members do not adhere to OSH rules and regulations. The construction industry has also been said to be dirty and involves difficult work. The work is often dangerous and present safety hazards which if not managed and prevented can result in injuries to the workers (International Labor Organization, ILO, 2004).

According to ILO (2004) some accidents that occur in the construction industry involve contact with moving machinery or materials, being struck by moving, flying or falling objects, being hit by a moving vehicle, being struck against fixed or stationary objects, injuries resulting from handling, lifting or carrying objects, slips, trips and falls on the same level, falls from a height, exposure to or in contact with harmful substances, exposure to fire, exposure to explosions or contact with electricity or electrical discharges (ILO, 2004).

Furthermore, most cases and accidents that occur are due to decisions made by management and failure by supervisors to follow laid down safety procedures. The root causes of accidents include; lack of proper training, deficient enforcement of safety and lack of safety equipment, unsafe methods, unsafe site conditions, not using provided safety equipment and poor attitude towards safety (ILO, 2004).

1.2 Statement of the problem

Studies have shown that accidents are more rampant in the construction industry than manufacturing industry (Kabungo, 2016). Despite measures put in place by the Zambian government such as use of the Factories Act of 1994, Company Safety and Health Regulations and others, accidents were still experienced in selected construction sites of Lusaka city. This could be as a result of failure to adhere to OSH management rules and regulations in construction sites by some employees. Against this background, this study examined OSH management practices in selected construction sites of Lusaka city.

This is because accidents due to failure to adhere to OSH management practices could result into fatalities, injuries and illnesses which have a massive impact on the employees as well as their families. Thus, it will be essential that proper health and safety management practices are carried out throughout the various stages of construction, from inception through to completion and operation of the project so as to reduce the probability of accidents occurrence at the selected construction sites.

1.3 Aim

The aim of this study was to assess occupational health and safety management practices in selected construction sites of Lusaka city.

1.4 Specific objectives

This study was guided by the following objectives:

i. to identify the safety and health hazards at selected construction sites of Lusaka city.
ii. to examine the challenges that workers face in terms of occupation health and safety management in selected construction sites of Lusaka city.
iii. to suggest sustainable mitigation measures that can be put in place to improve occupational health and safety management practices in selected construction sites of Lusaka city

1.5 Significance of the Study

The results of the study could be of great benefit to the following:

a) *Employers:* The study could be beneficial to employers as they would take seriously the importance of training their workers on how to use equipment and how to work safely in construction sites. This would help the employers to minimize workplace hazards and risks such as slips, trips and falls from height. It would also lead to improved performance and help in completing the project on time as there would be reduced incidents that would cause injuries and workers would be confident to go for work knowing it is a safe environment that boosts their morale and productivity.
b) *Employees:* It could also be significant to the workers in selected construction sites as it would help them acquire knowledge on the importance of Occupational Health and Safety management practices such as wearing the right Personal Protective Equipment (PPE), handling of equipment and construction materials. They would also be able to identify hazards and interpret safety signs within the construction sites.
c) *The clients:* Clients usually have a deadline for their projects. Therefore, it would be of great benefit to them as the delays of the project would be avoided as there would be less or no accidents that might slow down their projects due to few workers at the site or in search of new ones as when an accident occurs that causes an injury or death.
d) *Policy Makers and Management:* This study could benefit policy makers as it would ensure that the laws are followed as well as help them in decision making process. Additionally, this research would critically identify the hazards at the workplace and the harm they might have on the health and safety of the workers, public and employers.

II. LITERATURE REVIEW

According to Lucky (2010) construction is one of the main industries that experience fatal injuries among workers. Therefore, hazards identification is important in construction sites because it helps to determine appropriate ways to eliminate hazards or control the risk when the hazard cannot be eliminated. Josephine (2017) further explained that hazards identification is important so as to find and record possible hazards that may be present at the workplace. Therefore, in construction industries, either at the global, Africa or local level nothing much has been done on hazard identification rather the focus has been on the causes, effects, and mitigation measures as indicated below in the literature review.

2.1 Causes of poor OSH management practices at construction sites in selected studies

Holmes (1999) conducted a research from a sample of Australian construction sites. His study found that small construction firms do not manage OHS risks as effectively as large firms. He commented that those small business construction firms in Australia did not feel the need to focus on OHS in their management systems; instead they often believe that the control of OHS risks is the responsibility of the employees. This poor OHS management practices has led

to a lot of accidents and injuries in most small construction sites in Australia.

A study conducted Mubita *et. al.* (2021) titled *Safety Education and Training: On Site Lessons for Workers in selected Construction sites of Lusaka District* noted that construction sites employed a lot of workers with low qualifications related to their jobs. Therefore, there was need to have onsite training for such workers in order to make them aware of safety and health issues within their working environments. On-the-job training at the worksite is appropriate for workers facing specific hazards found onsite. If the training and education has to be significant, a comfortable classroom facility within the worksite is strongly recommended. There should be real lesson planning and training for construction workers (Mubita, 2021). Education and training also provides workers and employers with an understanding of the safety and health program itself so that they can contribute fully to its development, monitoring and implementation in the long run (Mubita, Milupi, Monde, and Simooya, 2020).

Nishgaki (1994) carried out an investigation of construction injuries that occurred between 1981 to1985. During interviews with construction managers and worker she found out that human ware accounted for much of the underlying causes of occupational accident recurrence. Human ware is defined as a function of composed of leadership, fellowship and the interaction between them (Nishgaki, 1994). His research suggested that the major causes of OSH failures were inadequate safety education, inadequate instruction and willful transgression which are caused by lack of management commitment which is responsible for the majority of the human ware problems.

Another study in Malaysia by Davies and Tomansim, (1999) showed that one of the causes of poor OSH management practices which has led to a lot of accidents, injuries and death in most construction sites is lack of occupational health and safety policy and training. His study showed that most construction companies lacked a company policy statement which clearly states how the company is organized in respect to the health and safety of the employees and also the organization of management commitment to providing safety information training and advice to employees.

Furthermore, another study conducted by Hinze, (1988) showed that lack of safety committees is also another cause of poor OHS management which has resulted in accidents, falloffs, injuries and even death. Tam et al (2004) did a study in China and noticed that the causes of poor OHS on construction sites is due to poor safety awareness from top leaders in management, lack of training and poor safety awareness of project managers.

According to the study conducted by Pipitsupaphol and Watanabe, (2000) poor OHS management practices in most construction sites in Thailand is caused by lack of certified skill labor, lack of strict operational procedures lack of experienced project managers; shortfall of safety regulations, lack of protection in material transportation, lack of protection in material storage, lack of teamwork spirits, excessive overtime work for labor and shortage of safety management.

III. METHODOLOGICAL FRAMEWORK

3.1 Research approach

This study used qualitative approach. Qualitative approach is defined as being subjective (not objective) and findings are gathered in a written format as opposed to numerical (Yin, 1994). The study used this approach in order to gain an understanding of underlying reasons and opinions to OSH management practices in selected construction sites of Lusaka city. Qualitative approach was the best for this research because it helped the researchers understand the views, opinion and perceptions of construction site workers on how the OSH management practices affected them.

3.2 Research design

The research design that was used in this research was a case study. A Case study is the study that involves in-depth analysis of a particular topic (Yin, 1994). Therefore, case study was used in order to investigate how OSH management practices affected the workers at the selected construction sites in Lusaka city. In addition, a case study helped the researchers to have a better understanding on how OSH practices could be improved at selected construction sites. Furthermore, a case study was used in this study, as it allowed researchers to investigate a topic in far more detail than might be possible if they were trying to deal with a large number of research participants.

3.3 Target population

This study targeted construction site employees, employers and sub-constructors. Employers were involved in the study because it was their duty to provide a safe working environment for the workers according to OSH Management Act Number 36 of 2010. Employees were involved in the study because they were exposed to construction site risks. In addition, both employers and employees got involved in construction related accidents and their families got affected directly or indirectly.

3.4 Sampling size

A total of 10 participants from three (3) construction site were chosen which gave a total sum of 30 participants. The sample size comprised of employees, employers and sub-contractors.

3.5 Sampling methods

Non-probability approach, also known as non-random sampling was considered. In this method not every member stood an equal chance of being selected and be part of the sampling processes. In addition, under this sampling method, volunteer sampling and convenient sampling were used. This was because it depended on participant's convenience,

meaning the participants participate at their own convenient time.

3.6 Data collection

The study used qualitative method of data collection. Therefore, semi- structure interviews, observations and document analysis were used to collect both primary and secondary data.

3.7 Data analysis and processing

Data was analyzed by thematic analysis method which involved bringing out related emerging themes and categorizing them in one major theme. The responses were grouped in themes according to the research questions in this study. These themes were used as the variables whose frequency distribution showed the ones that were more recurring than others thereby providing answers to the research questions of the study (Handy, 2001).

IV. PRESENTATION OF RESULTS

4.1 Demographic characteristics

According to Fiancy, (2009) demographic characteristics is the collection and study of data regarding the general characteristics of specific populations. Demographic characteristics were important to this study because it provided dada regarding research participants. Demographic information was an essential element in the study as it described the characteristics of research participants. In this chapter, demographic characteristics include; gender and number of participants.

4.1.1 Number of participants

Table1 shows the number of participants, employees being the most participant's (19) followed by employers (7) and sub-constructors (4)

Table 1: Number of participants

S/N	PARTICIPANTS	NUMBER
1	Employers	7
2	Sub-contractors	4
3	Employees	19
4	Total	30

Source: Field Data, (2020)

4.1.2 Gender of participants

Gender was a factor of consideration in this study on OSH management practices in construction sites in Lusaka. Gender of participants was important in coming up with relevant and first-hand information from both male and female. The study found out disparities in terms of gender representation. Males participated more than females. Figure 2 shows gender of participants.

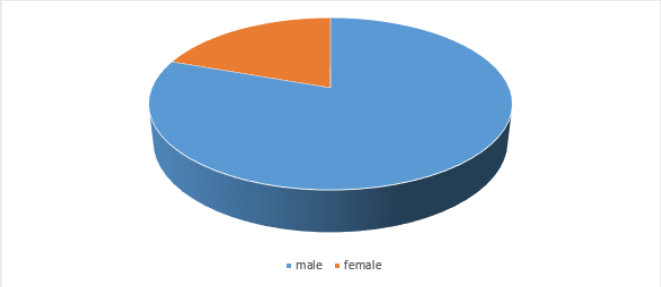

Figure 2: Gender of participants

Source: Field Data, (2020)

4.2 Identification of hazards at construction sites

Question 1: In your own view, what are some of the hazards that you are exposed to in your construction site?

Hazard identification was part of the process used to evaluate any particular situation, item or thing. Hazards come in many shapes, some more serious than others, and vary depending on the working environment. The participants were asked on the hazards that they were exposed to at their construction sites.

Participants 30 explained how he identified hazards at a construction site as follows:

> Hazards are things in the environment that can cause harm to a person. The hazards that we face here are that of dust as we do not even have safety goggles and face masks. We also exposed to falls from heights as you can see the wall is not barricade and we do not have safety harness (Participant 30, Construction site A, SSI, October 2020).

Another participant explained the hazards they were exposed to as follows:

> Here where you are seeing us we are exposed to working under the sun six to six which is giving us headaches. We also face issues of cuts and other injuries while working with machines (Participant 2, SSI, Construction site C, October 2020).

Participant 15 explained the hazards they were exposed to while working at the construction site as follows:

> We are mostly exposed to carrying heavy loads everyday such that our backs are ever in pain. We also work long hours with only rest for an hour for lunch. Even the type of work we are given sometimes requires us to be standing for a long period (Participant 29, SSI, construction site B, October 2020).

Participant 13 explained how hazards were caused at the construction site as follows:

> At this construction site, and were I operate from the main hazard is vibrations from the machinery like the compactor over there. When the machines are in

> operational they produce a lot of vibrations which affects our hearing in this environment. Sometimes we are given earmuffs for the protection of our ears while other times we are not given (Participant 13, Construction site B, SSI, October 2020).

Participant 16 explained the hazards they were exposed to while working at the construction site as follows:

> We are exposed to fumes which are produced as a result of the vehicles exhaust, for us who works outdoors it is even worse. Every time vehicles come in especially these concrete mixers which are not serviced often, they produce a lot of fumes which sometimes makes our eyes irritated and throat as well (Participant 4, Construction site A, SSI, October 2020).

Participant 23 from construction site A identified the hazards as follows:

> We are exposed to electrical shocks from overhead power lines, damaged cords and improper use of extension cords. When working from heights and get electrocuted, it results in falling causing severe musculoskeletal injuries and shocks it can even lead to burns which can result to blistering (Participant 23, Construction site C, SSI, October 2020).

Another participant explained that one of the hazards they were exposed to in relation to moving machinery as follows:

> Machines help us in the improvement of production and efficiency but they do come with risks. We are exposed to hazards and risks from moving machines such as the moving parts, sharp edges and hot surfaces. These hazards usually occur at the point of operation or when work is being carried out on a material for example when cutting, shaping or forming of stock (Participant 17, Construction site B, SSI, October 2020).

Few other participants explained how site explosions lead to devastating damage and injuries as follows:

> With the presence of flammable chemicals, electrical equipment and wiring and pressurized containers, we are exposed to many hazards that result in explosions. For example, chemical explosions from fuel or chemical tanks/drums, this type of explosion also results from welding, drilling, electrical sparks and heavy equipment coming into contact with underground pipelines. Many of our colleagues incur extremely serious although not fatal injuries such as severe burns, hearing loss and borne fractures (Participant 8 Construction site C, SSI, October 2020*).*

4.3 Challenges workers face at the construction sites

Question 3: What are the challenges workers face at construction sites?

The study also investigated challenges faced by employers and employees at selected construction sites. This was meant to help in examining the challenges that workers face in terms of Occupational Health and Safety Management. Selected responses from both employers and employees were expressed exactly as follows:

Participant 26 expressed challenges faced in communicating with foreign employers. He expressed it as follows:

> We have a communication barrier with our foreign employers' especially when we want to report a risk which needs urgent attention and we end up using sign language which is hard to understand (Participant 26, Construction site A SSI, October 2020).

Another participant expressed the challenges encountered while working at the site as follows:

> Employers do not provide for us PPE and mostly they tell us to come with our own and for some of us who do not have, we are told to buy using our own money. When we complain to our employers, we either get threatened of getting fired or immediately get dismissed from our jobs (Participant 11, Construction site B SSI, October 2020).

Some participants who work from heights expressed the challenges they encounter as follows:

> *We usually use unstable scaffolds and ladders and those we have available are inadequate as a result we end up making our own ladders using sticks and woods we pick from our surroundings. Due to these unstable ladders, we encounter many accidents while working at height such as falls (Participant 16, Construction site C SSI, October 2020).*

Other participants expressed challenges faced in terms of sanitary conveniences as follows:

> *We do not have changing rooms, toilets and water access points, we therefore, end up using our own money resulting in extra expenses such as fee paying toilets and buying water for drinking and we also ease ourselves from anywhere we see there are no people looking, as a result this bring about infections and some diseases among us and the surrounding communities (Participant 7, Construction site C SSI, October 2020).*

Participants from one of the selected construction sites also expressed their challenges due to lack of safety officers as follows:

> *We do not have safety officers to monitor us and train us on some safety rules and practices to follow at the construction sites and there is no one to carry*

> *out the risk assessment. As a result we are faced with many risks and hazards that we have no idea how to get rid of or who to report to because even our employers do not know how to go about it as their job is only to ensure that the construction is progressing. So when we have an accident, we are only given a small amount of money (K100-150) to go the clinic (Participant 29, Construction site A SSI, October 2020).*

Most employers from the selected construction sites expressed their challenges in relation to the safety regulation standards as follows:

> *Most of our employees do not follow the safety rules put in place such as wearing full PPE due to the dislike of wearing them, lack of reporting risks and hazards in fear of being whistle blowers and also not following signage rules as a result of not paying much attention during training (participant 4, Construction site B SSI, October 2020).*

4.4 Sustainable mitigation measure to reduce hazards at construction sites

Construction workers were asked how their employers could help improve occupational health and safety management practices which were in line with the challenges they were facing. This could help them come up with new initiatives meant to reduce hazards and risks at construction sites. The responses were as presented below:

> *Currently, we do not have a translator to help us in communicating with our foreign employers, so we would like our Zambian supervisors help us in employing someone who is literate in speaking both local and foreign languages so that even those who are unable to speak English can be able to be spoken to in other local languages (Participants 21, Construction site C SSI, October 2020).*

Another group of construction workers suggested change on lack of PPE as follows:

> *There is inadequate provision of PPE. We would like our employers to provide us with full PPE so that we can be able to protect ourselves from workplace risks and hazards (Participant 9, Construction site B SSI, October 2020).*

Another group of construction workers suggested change in relation to unstable scaffolds and ladders as follows:

> *Due to unstable scaffolds and ladders, we usually face a number of risks from trips and falls while working on heights. We therefore, would like our employers to look into the matter to ensure that we have enough and strong scaffolds to work on so that we can mitigate the challenges we face while working on height (Participant 3, Construction site A SSI, October 2020).*

Another group of construction workers suggested change in relation to lack of sanitary conveniences as follows:

> *We do not have toilets and taps for washing and drinking water. Employers should provide for us sanitary facilities like mobile toilets and water access points in order for us to reduce on some expenses of paying to public toilets or easing ourselves in public and buying water for drinking (participants 17, Construction site A SSI, October 2020).*

Another group of construction workers suggested the need for safety officers as follows:

> *Lack of safety officers is a challenge that our employers should also consider as this has led to a lot of safety rules not to be followed. Our employers should employ safety officers to monitor and supervise us so that we can have someone to report to whenever we encounter any risks and hazards as well as to carry out a risk assessment. The safety officers also helps the workers to comply with safety and health rules at the sites (participant 5, construction site C SSI, October 2020).*

V. DISCUSSIONS OF RESULTS

5.1 Hazards at selected construction sites in Lusaka city

The following were hazards noted in selected construction sites of Lusaka city:

a) *Explosions:* The participants explained that due to presence of flammable chemicals, electrical equipment and wiring and pressurized containers, workers were exposed to many hazards that resulted in explosions. Explosions occurred when electrical equipment malfunctioned or there was contact with power lines or energized wires. These exposed workers to danger. The findings are in line with Donny (2009) who explained that, arc flashes and blasts cause explosion at many construction sites.

b) *Moving machines and cuts:* Participants in selected construction sites also explained that machines helped them in the improvement of production and efficiency but they come without risk Workers were exposed to hazards and risks from moving machines such as the moving parts, sharp edges and hot surfaces. These hazards usually occurred at the point of operation or when work was being carried out on a material, for example, when cutting, shaping or forming of stock. The findings are backed up by Person Protective Equipment Regulations (1992) which explained that workers who use machines are exposed to different hazards such as heat or cold, noise, vibration and radiation.

c) *Trips, Slips and falls:* Participant explained that they experienced slips, trips and fall hazards. They

explained that some working surfaces were slippery and caused slips among workers on site. According to Health and Safety Executive, (2019) trips, slips and falls are most common causes of injuries at a construction sites. According to this study, trips, slips and falls were caused by slick spots, debris, clutters and unsafe stairs or ladders in selected construction sites of Lusaka city.

d) *Fumes:* Participants in this study also explained that they were exposed to fumes which were produced as a result of automobile exhaust. Every time vehicles came in, especially those concrete mixers which were not serviced often, they produced a lot of fumes which made workers' eyes irritated and throats choked. This situation had the potential of causing respiratory diseases to employees. The findings are backed up by Daniel (2010) who explained that airborne hazards at construction sites such as fumes have the potential to cause or exacerbate a range of serious respiratory disease such as asthma and chronic obstructive.

e) *Electric shock:* Participants explained that they were exposed to dangers of electric shocks from damaged cords, overloaded circuits, wet conditions, improper use of extension cords and other electrical sources. The findings are supported by Health and Safety Executive (2019) which states that electrical hazards that are typically found at construction sites include those arising from improper grounding, exposed electrical parts, inadequate wiring, damaged insulation, overloaded circuits and wet conditions.

f) *Noise:* Some participants narrated that they worked with big machines that caused vibrations and noise hazards. When the machines were in operation, they produced a lot of noise and vibrations which affected workers hearing in their environment. Sometimes workers were given earmuffs for the protection of their ears while other times they were not given. The findings are supported by Health and Safety Executive (2019) which states that drilling concrete and other surfaces could cause a myriad of injury to workers, especially over time.

g) *Manual Handling*: Other participants narrated that they were mostly exposed to carrying, pulling or pushing heavy loads by hands everyday such that their backs were ever in pain. As a result, they were exposed to tiredness and fatigue. The finding are in line with Daniel (2010) who explained that manual handling at construction sites involving transporting or supporting a load by hand or bodily force. It includes lifting, putting down, and pushing, pulling, carrying or moving loads and these could cause injuries and pain in the musculoskeletal system of workers.

h) *Dust:* Participants also explained that their sites were marred by dust conditions. This dust affected their operations in certain cases. If not well handled, this dust could result in respiratory problems for workers, especially if they were not in proper PPE like safety goggles and face mask. According to Health and Safety Executive, (2019) regular breathing of construction dust causes diseases like lung cancer, asthma and silicosis. Construction workers must wear the right kind of PPE for the protection from dust.

i) *Heat from the sun:* Participants in this research explained how they were exposed to long working hours under the heat from the sun which led to development of headaches and sweating from time to time. Donny (2009) also noted that construction site workers are particularly vulnerable to health risks because they were exposed to some environmental factors such as working under high temperatures like heat from the sun which contributed to the risk of accidents and injuries.

j) *Paints and other chemicals:* Participants explained that they were exposed to paints and other chemicals in their construction sites. Exposure to these paints and chemicals in large concentration could cause nausea and affect breathing if they were working without any face protection. The findings are in line with Personal Protective Equipment Regulations, (1992) which states that construction painters are exposed to various solvent, including carcinogens and reproductive toxins, and the levels of total volatile organic compound concentration in many of the painting tasks exceeded the exposure limits. Construction workers need to be protected from chemical agents during their painting works by using personal protective devices and work practice measure.

5.2 Challenges employees face at the selected construction sites.

A number of challenges faced by the employees at selected construction site A, B and C were brought out. The following were the challenges that the participants highlighted:

a) *Lack of training or education:* according to participants in this study, their employers did not train them in relation to their work activities and that some construction sites did not have qualified safety officers to monitor them. As a result, they lacked knowledge on safety practices to follow at the construction sites. This lack of training caused many accidents at the sites because workers did not have knowledge on how they could prevent accidents. The findings are backed up by Person Protective Equipment Regulations, (1992) which states that, it is

the responsibility of the employer to get employees wearing PPE, no matter how challenging it is. Mubita (2016) and Mubita *et. al*. (2021) also noted that lack of education and training related to work could expose employees to hazards in their working environment. This is because employees may not be aware of hazards associated with their work activities. Information and Communication Technologies (ICTs) were not used in training and educating of site workers. This meant that some employees could lag behind in use of modern technology to combat risks on construction sites. The use of ICTs in learning environments was also recommended by Chirwa and Mubita (2021) to catch up with modern technology of teaching and learning.

b) *Communication barrier:* According to the participants, one of the challenges they faced while working at the sites was that of communication barrier. For example, the foreign employers mostly mainly used sign language to communicate with the workers which was usually hard to understand. The foreign employers also had challenges in speaking or understanding local languages used by some employees. This created a communication barrier. The findings are in line with George (2007) who advocated that, construction language barriers often lead to inefficiency and reduced productivity.

c) *Lack or inadequate Personal Protective Equipment:* Another challenge that the participants explained was that of lack or inadequate Personal Protective Equipment (PPEs). In most cases, PPEs were either not enough or not adequately provide to employees. The employees were at times told to buy their own PPEs. This affected the employees so much as some of them suffered injuries due to lack of PPEs. Injuries could cause absenteeism of workers at work and lower production. This is supported by Lu Rong Guan (2011) who highlighted that in the year 2016, more than 40% of accidents in construction sites happened due to the fact that the workers did not wear PPEs.

d) *Lack of sanitary conveniences:* Lack of sanitary conveniences was also one of the challenges that the workers mentioned when they were interviewed. The participants mentioned that, they did not have toilets where they could go to respond to the call of nature. This posed a challenge on them as they had to go out in the compounds to ask for help when they needed to use the restrooms. This resulted in delayment of project completion owing to the fact that some workers took time to come back to work when they had gone to look for places of convenience. This is in line with Chinnadurai (2010) and Mubita, Milupi, Monde and Simooya (2021) who found out that lack of access to sanitary infrastructure such as toilets in work places results into some health issues.

e) *Lack of safety officers:* Participants bemoaned lack of safety officers who were in charge of their safety welfare. Most sites had less qualified or few safety officers to guide general workers on safety and health issues. This meant that the general workers were exposed to hazards as a results of lack of knowledge. This findings was backed up by Dodo (2014) and Mubita, Milupi, Monde and Simooya (2021) who explained that, construction sites that did not have safety officers had challenges with evaluation and monitoring of safety hazards on sites.

f) *Poor quality tools and equipment:* Participants bemoaned the poor quality of tools and equipment used on site. For example, the participants mentioned that, the employers did not provide enough scaffolds and ladders for them, hence they used sticks to make their own ladders and scaffolds which resulted into a number of injuries with no death, fortunately. The findings are in line with Dekak (2017) who found out that a total number of three (3) people died when a scaffold collapsed at Miami television tower.

g) *Lack of safety rules and regulation adherence by workers:* In addition, the participants also stated that there was lack of safety rules to guide them, which actually led to low adherence by workers. Kawuwa (2008) and Mubita (2016) noted that lack of compliance to health and safety rules was the major leading cause of hazards in construction sites. Participants in this study also stated that they lacked adherence to the safety rules and regulations that made them get exposed to hazards.

5.3 Proposed hazards control measures in selected construction sites of Lusaka city

A number of mitigation measures to the challenges workers faced at selected construction site A, B and C were suggested as follows:

a) *Regular supervision of machinery and equipment:* When working at heights above 2 meters, one needed to put on a safety harness so that in case there is an event of falling, one might not be injured. Construction site workers should take safety precautions such as risk assessments before using scaffolds. If it is not safe to use, workers should always inform the safety officer or supervisor. The scaffolds have tags which are colored green and red which indicates the safe and unsafe of scaffolds. In addition, Samuel and Boyd, (2010) backed up the findings when their study discovered that if the scaffold is under erection or being dismantled, it has a red tag which says scaffold not safe to use and the one colored green which says safe to use.

b) *Training and toolbox talks:* New workers who come on sites have to undergo an occupational health and safety training (Mubita, Milupi, Monde and Simooya, 2021). Training and education can also be done by the use of Information and Communication Technologies (ICTs) so that those employees who are computer literate can find it easy to learn and teach others. The use of ICTs devices like computers were also recommended by Chirwa and Mubita (2021) to be used in training and education environments to enhance practicality and catch up with modern day technology. Every day in the morning before work start, toolbox talks should also be conducted. They act more like a reminder on how the employees are oriented to site risks in addition to formal training and education.

c) *Employ translator:* Employer-employee relationship is important in the construction industry. But for it to be effective, there should be good communication. Good communication requires the two parties fully understand each other in terms of language. As such, at construction sites where language is a barrier, there is need to employ translators. This arrangement can help close the language barrier. In line with this, Ziane, (2009) outlined some steps employers should follow to overcome language barrier at construction sites. He states that, an employer should assess the company's language needs to identify linguistic strengths and weaknesses and determine future language need.

d) *Risk assessment:* Risk assessment is a mitigation measure that must be employed at construction sites. A risk assessment should be conducted so as to spot out and reduce hazards at the construction sites. In line with this, the Management of Health and Safety at Work Regulations, (MHSWR, 1999) and Mubita (2016) explained that, employers are required to carry out suitable and sufficient assessments of risks to health and safety of employees and third parties.

e) *Provision of welfare facilities:* Employers have the duty to provide their employees with sanitary facilities, which includes functional toilets, bathrooms and running water for other purposes at the construction site (Mubita, 2021). Clevenger et al, (2017), also narrates that construction site hygiene is essential to ensure the health and well-being of the workers.

f) *House Keeping:* This means cleaning the site every day, ensuring the walking surfaces are level and without any dangerous obstacle, and scrap or potentially injurious material is stored safely and out of the way. This can help prevent slip, trip and fall hazards on site.

g) *Employ more safety officers:* It was noted that most of the construction sites lacked professional safety officers. To this effect, safety officers should be employed at construction sites in order to cultivate a positive safety climate and make crucial safety decisions. Toole, (2002) stipulated that construction professionals, based on the occupational safety and health administration's general duty clause are expected to ensure the safety and wellbeing of the employees. Such efforts will not only address the skill requirements for the industry but can also lead to superior hazard recognition levels and dramatic reduction in the number of injuries.

h) *Provide PPE:* Safety is a major issue for all employees. Each year accidents happen frequently in the construction industry and often times it is due to the absence of personal protective equipment or failure to wear the provided PPE. Employers must provide the appropriate PPE to their workers and ensure they are worn appropriately at all times. Abdelhamid et al (2000) states that, the purpose of the PPE is to reduce employee's exposure to hazards when engineering and administrative controls are not feasible or effective to reduce the hazards at the acceptable levels.

VI. CONCLUSION

The study established that selected construction sites in Lusaka city faced challenges such as communication barrier, lack of safety officers, poor equipment and tolls, lack of sanitary conveniences, inadequate personal protective equipment and lack of safety rules and regulations adherence by workers. This exposed workers to certain construction hazards and risks. The researchers concluded that occupational health and safety management practices at selected construction sites of Lusaka was poor and attributed to injuries among workers. OSH management practices at sites would be more effective if government inspected how construction management companied were complying with safety rules at least twice every month.

VII. RECOMMENDATIONS

Based on this study, the following are the recommendations to be implemented in order to improve occupational health and safety management practices in construction sites of Lusaka city:

(a) Train all employees on safety and health management related to their construction sites.
(b) All employees should be involved in every aspect of safety and health issues to establish a sense of belonging which in turn could change their attitude to safety practices at the construction sites.
(c) Employers should ensure that employees are able to properly wear and maintain their Personal Protective Equipment. This gives immediate protection to

employees from hazards as engineering controls are put in place.

(d) Employers should ensure that those employees working on heights work on movable scaffolds. This will prevent the accidents from falls from height.

(e) Provide sanitary facilities for the employees. There is loss of productivity due to a lot of time spent on looking for places of convenience instead of working.

(f) Incentives should be introduced in form of awarding teams or workers who uphold to good safety practices as employee's motivation. Furthermore, construction sections who uphold the most improved safety practice should also be awarded.

(g) Management at construction sites should consider putting up safety signs that can be understood by any person which will help in educating the clients or employees who may not have received any safety education concerning their health and safety.

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