

An Evaluation of the Effectiveness of Health and Safety Induction Practices in the Zambian Construction Industry

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Abstract—The study discusses the effectiveness of health and safety induction practices on construction sites against the background of the Zambian construction industry experience. The research design included the literature review of relevant literature. Questionnaires and interviews were administered to regulatory bodies, health, and safety personnel. Observation was also employed on construction sites to assess the health and safety practices being used. Health and safety in the construction industry are not something to be ignored or overlooked. The construction industry needs to take heed of the serious consequences of inadequate health and safety induction practices. The implications of inadequate health and safety induction procedures included among others threats to profitability, corporate social responsibility and increased turnover of the workforce leading to poor productivity. Adequate health and safety practices can improve the health and wellbeing of employees, reduce financial implications on firms and encourage productivity on construction sites. Despite this, accidents are still prevalent on construction sites in Zambia. The overall result of this research denotes that the implementation of health and safety induction practices is inadequate, as indicated by the negligent and non-adherent attitude to health and safety induction aspects on the sites by most stakeholders on construction sites. Therefore, health and safety induction practices are ineffective as preventive measures for reduction of accidents on construction sites in Zambia.

Keywords—Accidents, employees, health and safety, inadequate induction.

I. INTRODUCTION

INDUCTION is the practice of providing Occupational Health and Safety (OHS) information to parties exposed to construction works i.e. new entrants, visitors to the site or existing workers on a construction site before engaging in actual work to help them settle and become familiar with the work environment [1]. The information provided through induction includes information about the site, work methods, proper use of plant, equipment, welfare facilities, emergency procedures, environmental issues, personal protective equipment (PPE), reporting of accidents and near misses, employer/employee responsibility, and providing awareness on regulations relating to health and safety. This assists to help reduce the occurrence of accidents on construction sites [2]. It aims to protect persons i.e. workers and visitors from the hazards associated with construction work. The construction industry is a highly disposed to accidents mainly because the industry is labor intensive, employing a large unskilled

workforce, as well as the type of work in itself, heavy duty plant and equipment demands and the constant changing environment of a construction site. Effective induction practices prior are a key aspect of disseminating the crucial information on how to prevent accidents and adjust to a changing environment.

II. REVIEW OF LITERATURE

A. Causes of Accidents

The construction industry is a highly accident prone industry with construction sites being acknowledged as dangerous places to work [3]. The causes of accidents include workforce casualization, changing work environment, the work method used, and the nature of the work itself. Health and safety hazards may be divided into three categories, namely the physical injury hazards, physiological hazards and the ill-health hazards [4]. Accidents can also be viewed as originating from a technical or human error [5]. The technical error could be in using technologically advanced machinery, whilst human error may be attributed to the unskilled level of users or indeed, sheer negligence. The multiple accidents causation theory postulates that there are many contributory causes leading to accidents [6].

Other schools of thought categorize causes of accidents into behavioral and environmental factors [7]. Behavioral factors include attitudes, skills and knowledge. The attitude aspect may be evident in workers that execute works that are repetitive in nature as they become too complacent with the job to be mindful of safety. Such workers often pose a danger to others and their workplace. Skills and knowledge become obsolete with the advancement of technology or the introduction of new work sections. Environmental factors include worksite hazards and procedures that contribute to injuries [7].

The causes of construction accidents in Uganda include a lack of induction, engaging an inexperienced workforce, and lack of respect for safety [8]. The main factors affecting safety in China are poor safety awareness, lack of training, reluctance to commit resources to safety, and reckless operations [5]. Construction workers work long hours, and in turn, become fatigued, a factor which can also lead to accidents [3]. A study in Lithuania identified that the major reasons for serious and mortal accidents are inexperienced workers, lack of qualifications and understanding of risk on a construction site [9]. A survey in Malaysia to identify the causes of accidents

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on construction sites found that unsafe methods, including incorrect procedures, knowledge level, and disobeying procedures are the most frequent reasons for accidents on construction sites [10]. In addition to these, secondary causes of accidents centered on management pressures, such as financial restrictions, lack of commitment, inadequate policy and standards, deficient knowledge and information, restricted training and task selection, and poor quality control systems. Induction procedures in Malaysia are not comprehensively executed such that incorrect procedures which could be short cuts to the steps engaged for the activity [10].

To conceptualize arguments on causes of accidents and ill-health problems on construction sites, it is observed that the causes of construction accidents can generally be classified into the five most influential factors namely, site conditions, equipment and materials, human, management and job factors (building/task it). Reference [6] writes that, site conditions such as the nature and physical layout of the work, location and weather, equipment and material specifications including paint and asbestos have the potential to cause ill-health problems. Other causes of accidents are due to the human factor that may be interpreted in behavior, competence, attitude and management such as the leadership and safety culture of the organization. When it comes to job factors as the genesis of accidents on sites, the nature of the task, design, detail, duration and the size of the structure itself have been identified.

In the United States, the Bureau of Labor statistics reported 775 deaths owing to construction works [3]. However, data on deaths, accidents or diseases directly related to construction work are not readily available in Zambia due to the extensive underreporting culture of the industry; therefore, making it difficult for interested parties i.e. government, employers to evaluate the health, social economic implications and the effectiveness of actions taken to prevent accidents [11]. Slips and falls are the most common cause of fatal accidents on construction sites accounting for 39% of cause of deaths in construction. These statistics would be an underestimation because most people do not usually relate their illness with their line of work [11]. Further, in most sectors other than the mining sector there is no requirement for post-retirement check-ups [11]. In Zambia records of deaths are kept, but that is just an end in itself, as there are no follow ups on the causes of the illness so as to take the measures to prevent similar cases in the future. This is further worsened by the lack of research on occupational health and safety in Zambia so that problems may be identified and measures taken to curb them [11]. Even though falls from heights or objects falling on people are the common cause of accidents, manual handling accounts for more days of sick leave and loss of earning capacity than any other factor [11].

B. Importance of Health and Safety Induction

Health and safety induction practices improve performance of construction projects and reduce injury rates on construction sites [12]. The knowledge of safety hazards may provide checks and balances to young energetic and

overzealous workers who may be threats to their colleagues as well as themselves for reasons of either wanting to impress the supervisor or just to keep the job. On the other hand, Health and Safety induction practices allow the project to be completed within its targeted execution time without delays caused by lost man hours by workers who have died or been injured due to site accidents. Critical elements of health and safety induction practices such as safety policy, safety committees and safety inspections are cited by [7] as a means of reducing accidents on construction sites. Workplace safety training and induction should be planned to take into account an overview of the general legal and safety requirements for the workplace, let employees know employers and employees legal rights and obligations, helps parties to identify hazards, assess risks and implement controls to reduce the likelihood of workers being injured and include site and work specific training [7]. There are three types of induction practices namely general induction, site induction and task specific induction [13].

C. General Induction

General OHS induction gives basic knowledge on health and safety to new employees on the common hazards and how they can be addressed [11]. It basically provides a wide appreciation of health and safety induction aspects on a general perspective, especially because the majority of the labor force is unskilled.

D. Site Induction

Site induction is conducted on-site by individual contractors and therefore, provides rules and regulations that are consummate with the contractor's method statement [12]. It addresses OHS issues and safe work practices which are specific to a particular building and construction site, which includes knowledge of the contractor's rules and procedures for site safety, emergency management, the supervisory and reporting arrangements and other site-specific issues [12].

E. Specific Induction

Specific induction aims to provide workers with knowledge of the OHS issues and safe work practices relating to a specific task on site. As a construction site changes, there is a need to give workers new information on potential hazards. This type of induction is done specifically for special operations that require operational appraisal or jobs that are high risk i.e. working at heights. For example, as new machinery is introduced on construction sites, specific induction procedures need to be put in play. The top three most broken regulations on construction sites are to do with protection from falls, the lack of established system to exchange information on hazards and insufficient scaffolding [14]. Not all accidents qualify to be reported, the accidents should be work related and of a reportable type (i.e. death, amputations, fractures, sight loss, internal organ damage, etc.) [15]. Health and safety is a cross-disciplinary concept that is concerned with protecting the safety, health and welfare of people on a construction site [16]. The levels of adherence to health and safety regulation by contractors are general to low

and alarming, posing a great risk to employees in the construction sector [17]. Some of the ways in which induction is conducted includes orientation, signage and use of the buddy system.

III. METHODOLOGY

The survey targeted construction site workers and health and safety officers from construction sites. Workers were selected because they are key personnel upon which induction processes are focused and that they are prime movers of labor intensive projects. They are the custodians of health and safety requirements on construction sites. The study also targeted regulatory bodies such as the National Council for Construction (NCC) for its direct input on matters to do with Health and Safety on construction sites. Observation was also used to observe implementation of induction practices such as signs how and wearing of PPE. Therefore, a total of 130 participants were administered with questionnaires and all of them provided feedback, translating to 100% response rate. The responses clearly indicate a sufficient percentage base from which to found the research analysis on.

IV. FINDINGS AND DISCUSSION

A. Employer Responsibility

Some of the responsibilities of the employer include providing safety induction and clear site rules, maintain an injury register, provide PPE, provide first aid training and treatment i.e. giving cardiopulmonary resuscitation (CPR) and to also work together with workers with regard to health and safety. Some 65% of workers indicated that site induction in the form of site rules, regulations, sign posts and toolbox talks are done on construction sites. Therefore, workers have an awareness of the contractor's expectations of the observance of rules and regulations as an aspect of health and safety induction.

Emergency procedures in the case of fire and first aid training are not emphasized on construction sites. Construction sites have no first aid officer. Task-specific induction such as work procedures are done according to 55% of respondents. It was revealed that falls from high heights are a commonest type of accident. According to [14], the most common causes of fatal accidents are those resulting from falls i.e. people or objects' falling on people and the best way to mitigate is to give workers task specific induction which is unfortunately not done. These findings are consistent with the literature review in that falls from heights remain the most common type of accident on construction sites. There seems to be non-compliance to the use of PPE relevant for works at high heights. The findings also suggest that working at heights may be more challenging to most workers and so may require some job-oriented health and safety induction. Developing countries like Zambia are just awakening to high technological constructions, and hence, it is valid enough to assume that the work load for workers on sites may be too challenging for them. It was observed that there is an inadequate use of safety harnesses, as scaffolds were the only kind observed on the

construction sites. Moreover, it is probable that the provided harness may not be used correctly, and so, supervision by both gang leaders needs to be intensified, as 90% of workers are unskilled.

Overexertion (fatigue) (16.73%) was rated as the second main cause of accidents on construction sites. It is important to design the work area correctly, taking into consideration aspects of manual handling i.e. lifting heavy things, pulling, holding, wheeling etc., and workers were observed as being highly exposed to take part in manual handling activities such as carrying cement, wheeling aggregates. Even though carrying of objects should be assessed on a personal basis by the worker, 80% of workers say they are not made aware of the safe ways of lifting heavy objects, and 75% of workers complain of backaches due to incorrect lifting and handling of heavy objects.

Falling debris, materials and objects (15.71%), slips and falls (13.06%) and cuts from sharp objects (12.86%) were also registered as common responses. This suggests poor housekeeping which tallies with the research observation made. These accidents are highly linked to housekeeping, and therefore, are an indication of the existence of a gap in the health and safety induction aspect of housekeeping.

The data above show that, most contractors do not provide continued health and safety training to their casual workers. Additionally, health and safety awareness and training are not done on construction sites; 61 % of the casual workers and 93% of health and safety officers agreed that health and safety site induction and orientation are done only at the beginning when workers are employed. Induction of new workers on the first day of employment is important as it sets the health and safety requirement, leaving a long lasting impression on workers and helps develop a healthy, safe work culture. The induction is only carried out for a day throughout the life cycle of a project. A total of 70.5% of casual workers said that they are not taught how to use health and safety facilities and have to figure it out themselves. It was noted that 62% of the sites do not have health and safety slogans on sites. Therefore, it can be concluded that contractors are putting very little effort into training/equipping the workers on construction sites in terms of health and safety.

All construction sites surveyed had a written health and safety policy on the site. Employers are knowledgeable about the legal requirement pertaining to health and safety; it is up to the employer to impart health and safety awareness to the workers as they carry out daily construction tasks. Most (90%) construction sites on paper have a formal system for reporting, recording and investigating accidents, injuries, cases of bullying, near misses and illness on site. However, there is only a 48% level of adherence to reporting of accidents, injuries, cases of bullying, near misses and illness on site. This aspect of health and safety induction is neglected and may not provide management with better ways of reducing and managing hazards. The importance of reporting accident or near misses is that it helps find the root causes and ways of preventing accidents [2]. All workers and management can therefore benefit from this information. Often, safety measures

are reactive but by reporting near misses and accidents, safety activity can be proactive, and thereby, improving worker safety and the safety culture on sites.

Employees are made known of where welfare facilities on site are located i.e. toilets, cooking areas and dump site. This helps prevent illness and improve worker welfare. Induction training should be done in such a way that it combats any cultural or language barriers [16]. It was observed that local languages were the means in which site inductions were conducted. Visitors to the site are accompanied and supervised by safety aware personnel. Visitors are also equipped by hard hats, and must sign in and out. This allows for ease of evacuation should an emergency situation arise that requires the site to be cleared of employees.

B. Employee Responsibility

Workers have a responsibility to take care of their own health and safety and that of others. These responsibilities include cooperating with the employer, conducting work in a healthy and safe manner, reporting accidents or near misses and proper use of equipment and tools. Despite this knowledge of the contractor's rules, it was observed that taking alcohol and not wearing PPE are common occurrences on these sites. Employees take risks because of time pressures; they become complacent because they have been lucky every day, peer pressure from fellow workmates, over estimating their experience, underestimating outcomes and over confidence with equipment or PPE. All these factors all have an influence on the risk perception of hazards and consequently behavior on construction sites. Hence, supervision is a critical aspect of health and safety. Management approach towards health and safety can prove to have an effect on overall employee work culture i.e. conduct inductions without proper provision of PPE sends mixed messages to workers.

TABLE I
 WORKER ATTITUDE TOWARDS H/S

Factors	Client Rep %	Casual workers %
Occurrence of Accidents	78	74.5
Following HS Instructions	63	57.7
Attendance of HS Meetings	89	43.8
Practice of short cuts at work	79	51.4
Don't refuse to work without PPE	63	70
Not Appreciative of HS	88	57

The findings reveal that 'inexperienced workers' and worker negligence with a response level of 17.6% are the highest cause of accidents on construction sites, while 'Lack of implementation of safety policies by regulatory bodies' are perceived to be the second cause with a response level of 16.4%. 'Financial restrictions on PPE by management' was viewed as the third cause of accidents, gauged at a 16.2% response level, followed by "worker negligence" at 14.2%. Despite being provided with basic PPE, workers chose to do risky jobs without any adequate protection. This indicated that supervision on sites is not critically implemented and so workers get away with inappropriate site conduct. It also

shows that workers have low perception of risk or do not understand the value of their lives. A majority (81%) of casual workers confirmed they receive punishment when they break health and safety rules. Disciplinary or corrective action is a process of communicating with the employee to improve unacceptable behavior or performance. The severity of the issue will determine the appropriate corrective action and can range from verbal warnings to termination of employment. However, the negligent culture of workers may require that workers have more training related to their duties and responsibilities, both to themselves and others on site. This information can be confirmed with the findings reveal a high response level on 'worker negligence' as a cause of accidents on construction sites. Employees tend to work without PPE due to unfamiliarity and discomfort which may lead to low productivity. High stress levels were indicated as one of the main causes of accidents. Workers strive to meet hectic deadlines and see wearing PPE as affecting their production.

V. CONCLUSION

The construction industry to date remains one of the most dangerous industries for employees. Prevention of accidents through induction is one of the most effective means of dealing with hazards before they occur on construction sites. Induction is a starting point for an organization to introduce a culture norm that supports health and safety. Studies suggest that induction training on its own is not sufficient to fully discharge all legal obligations in relation to training and health and safety. An effective system should include aspects of planning to tailor site specific health and safety practices, constant supervision, fair and appropriate discipline and continued knowledge and awareness of site risks posed to workers as the site changes. Furthermore, experience indicates that high health and safety standards are achieved on projects where clients are committed to health and safety and provide appropriate management oversight. Construction workers also have a role to play in ensuring that they implement what is learnt and disseminated during induction. Training should be administered at regular intervals to ensure workers internalize the proper conduct and use of PPE as a must.

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