CONSTRUCTION WORK AND THE HOUSEKEEPING CHALLENGE IN LESOTHO

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A key element of advances in site management practice is the provision of an environment in which construction work is completed without exposing people to harm. Among other issues, the removal of physical hazards on construction sites is dependent on housekeeping, which is a source of genuine worry in the industry in Maseru, Lesotho. With improvement intentions, this paper reports the outcome of a research, which sought responses to "why is housekeeping a continuing challenge in Lesotho construction?" Using a multiple case study research design in which the field work involve direct site observations and focus group interviews of construction site management and workers, the study established the poor state of housekeeping in Lesotho. The use of the 5-Why root cause analysis shows that unsafe work practices go hand-in-hand with poor housekeeping on observed project sites. Inadequate method of keeping the construction site clean was worsened by poor storage and disposal of materials and wastes on the sites. The importance of housekeeping in a craft based industry, such as Lesotho, is hinged on the health, safety, and wellbeing of workers, apart from site productivity. The evidence from the research shows that it is time for multi-stakeholder interventions that would eliminate poor housekeeping in the industry. Such interventions should apply behaviour-based safety techniques to support the efforts of compliance-based safety.

Keywords: health & safety, housekeeping, construction site, Lesotho

INTRODUCTION

Organisational culture, which plays a major role in work performance and effectiveness, can be influenced by a country where a firm is based and it can also be influenced by the history of success and failure recorded in a firm (Zhang and Liu, 2006). In like manner, the safety culture in a contracting firm may be influenced by where the firm is operating and how the location is regulated. Safety culture may also be influenced by the vision, values, and beliefs of top management of a firm. While these influences make it difficult to objectively provide the definition of a "good" safety culture that fit into every setting, firms with a "good" safety culture have mechanisms in place to collect safety-related data, measure safety performance, and bring people together to learn how to work more safely (Ostrom, Wilhelmsen and Kaplan, 1993).

Firms with a good safety culture use these mechanisms to solve immediate safety problems so that all groups in the firm participate in addressing concerns while promoting positive attitude to safety (Ostrom *et al*., 1993). High safety standards in

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construction work thus require collective values, norms and behaviours that support effective safety controls (Torner and Pousette, 2009). It is however notable that such a practice is lacking in developing countries such as Lesotho where poor safety performance is often recorded in construction (Kheni *et al*., 2008; Bust *et al*., 2008). To address poor housekeeping that is reported to be an expression of a prevailing safety culture in a workplace (Becker, 2001), this paper attempts to provide a response to "why is housekeeping a continuing challenge in Lesotho construction"?

HOUSEKEEPING AND SAFETY CULTURE

Housekeeping, which is the day-to-day cleaning and keeping tidy of all parts of the construction site, is essential to avoid injuries and accidents in a workplace (Lingard and Rowlinson, 1994). This perception resonates in an empirical study where Haslam *et al*., (2005) observe that workplace factors, especially poor housekeeping that is evident through site layout and space availability problems, contributed 49% of the 100 accidents they studied in Great Britain. The problems observed include hazards in the form of objects that are protruding or causing slip and trip on sites. They also record uneven ground, debris, and muddy conditions. Haslam *et al*., (2005) note that these problems occurred with ill-defined walkways and poor housekeeping, which they say, "from the perspective of those familiar with safety in a wide range of other industries, poor site conditions found in construction appear to be a symptom of the weak safety and risk management culture in the industry (p. 410)".

The concept of safety culture is often cited with accident causation factors (Peckitt, Glendon and Booth, 2004). The concept emerged from the attempt to explain the Chernobyl nuclear disaster of 1986 (Ostrom *et al*., 1993; Glendon and Stanton, 2000). It is concerned with shared attitudes, behaviours, beliefs, norms, practices, systems, and values necessary for effective safety controls (Guldenmund, 2000; Glendon and Stanton, 2000; Peckitt *et al*., 2004). Although the concept of safety culture emerges from the Chernobyl disaster of 1986, its constituent of beliefs and attitudes that is manifest in actions, policies and procedures that determine safety performance are traceable to Heinrich's Domino Theory of accident causation (Ostrom *et al*., 1993). In addition, the typologies of safety culture shows that regulation, engineering, procedure and behaviour constitute its main categories (Shillito cited in Peckitt *et al*., 2004). From the four categories, the behavioural category indicates that workers are motivated to give their best when offered adequate training that enable them to get the job done. Studies show that empowering workers and delegating safety activities are consistently related to lower injury rates (Torner and Pousette, 2009). The behavioural category of safety culture is inclusive of policies, goals, objectives, procedures, manuals, records and audits that are used as tools to aid improved performance. In essence, companies are encouraged to adopt a positive organisational safety culture in order to eliminate accidents in their operations (Clarke, 2003) since the behavioural category of a safety culture is an enabler of safety compliance (Hafey, 2015). For instance, the motivation / morale of workers could be enhanced by reshaping rules into policies, objectives and targets (Peckitt *et al*., 2004).

The motivation of workers is necessary as poorly motivated workers could make a workplace untidy, apart from the manifestation of rework, poor craftsmanship, fatigue, and poor technical supervision (Loushine *et al*., 2006). The 'motivation' illustration aligns with the meaning of safety culture, which relates it "to the product of individual and group values, attitudes, competencies and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organisation's safety programs

(Health and Safety Commission, 1993 cited by Glendon and Stanton, 2000: 201)". In brief, where workplace conditions are poor, major positive shift in standards of site layout and housekeeping is required from contractors who are well placed to uphold acceptable safety practice (by implication safety culture) on construction sites (Haslam *et al*., 2005). Good housekeeping is expected to eliminate safety problems, improve morale, and increase productivity because workers generally appreciate a clean and orderly workplace where tasks could be completed unhindered (Becker, 2001).

RESEARCH METHODOLOGY

This research employed a multiple case study approach that describes current situation and then attempt explanations from observations that are supported with follow-up focus group interviews. The use of case study research emanates from the principal feature of case studies: to gain up-close assessment of a "case" within its real world context (Yin, 2013). The research was designed so that it can capture the complexity of housekeeping on multiple project sites, and attend to contextual conditions impacting on the case by observing human activities and the physical settings in which such activities take place (Angrosino and Rosenberg, 2011). In case studies, observations often take place in settings that are the natural loci of activity. Structured observations were conducted in this study. Structured direct observations were undertaken because human activities and physical attributes on selected project sites could be broken down to bits that researchers could note.

To make the notes, the use of a protocol is necessary (Yin, 2013, Thomas, 2015). Instead of compiling a protocol from the reviewed literature, a standard problem solving A3 tool was adopted for the study. The A3 tool was used as it is a recognised structured and standard work problem solver in both manufacturing and construction industries (Rubrich, 2012). Forbes and Ahmed (2011) note that the problem solving A3 sets the stage for analysing and improving construction operations through appropriate application of its seven sections, which include background, current condition and problem statement, goal statement, root-cause analysis (5-Whys), countermeasures, check, and follow-up actions. In other words, with modifications, the A3 tool with its origins in manufacturing is now used in construction (please see Rubrich, 2012; Forbes and Ahmed, 2011). The template of the A3 tool that was used in this study was obtained from MCS-Media (2012). The 5-Why analysis segment in the A3 tool aided the compilation of the discussion section of this paper, and the brainstorming segment of the A3 tool assisted in the facilitation of the focus group interviews with workers and site management after the analysis of the observation data from the four visited project sites. Site management and workers were interviewed after the site observations because of their on-site task responsibilities and direct involvement in housekeeping. In project A, a site agent, three general workers (labourers), and two foremen were interviewed. In project B, one site agent, one foreman, and one H&S officer were interviewed, and in project C, one H&S officer and one foreman were interviewed. In the 4th project (D), only one foreman agreed to be interviewed. The twelve (12) interviews were confidential, though permitted, due to the nature of the phenomenon being studied. All the participants of the focus group interviews took part in the sessions because they have the responsibility of keeping their individual project sites clean and tidy.

To account for the complexity of a case, and its associated context, case studies should rely on multiple sources of evidence, which vary from interviews to field observations

(either direct or participant). As such, the direct observations on the four project sites were supported with follow-up focus group interviews to confirm and corroborate the research findings (Yin, 2013). The collected data through on-site observations and subsequent focus group interviews were obtained from four project sites in Maseru the capital city of Lesotho. The gatekeepers (management personnel) of the project sites were contacted on phone and emails before access was granted to each project site in July - August 2015. Repeated visits were made during the field work. The initial visits were made to observe the sites as 'it is' before follow-up focus group interviews were conducted. With the use of the described A3 tool, the observations were recorded in each visit on the A3 report while photographs were used to provide supportive evidence. With the permission of the gatekeepers on selected project sites, photographs were taken in the field work so as to convey case features to outside observers (Yin, 2013). And in order to enhance reliability of observational evidence, two observers / researchers were utilised in the study. The observers, who are also co-authors of this paper, were final year built environment bachelor degree students at a South African university that is in close proximity to Lesotho. The study forms part of the 4th year research methodology subject in the South African university. The observations were concluded before the focus group interviews were conducted. The findings of the observations informed the open ended questions that were used to facilitate the focus group interviews. The interviews were tape recorded and transcribed after each session. Employing the thematic analysis procedure, the resultant interview transcripts were analysed based on the open ended questions of the focus group interviews.

RESEARCH FINDINGS

The findings of the site observations and follow-up focus group interviews are herein presented. As mentioned earlier, the direct structured observations were conducted with the use of an A3 tool. In general, the observations on the four projects reveal the untidy nature of work organisation on the sites (Figure 1). This is compounded by limited site size. Most of the sites were not able to accommodate needed materials on site. For clarity, the results are presented by following the findings from each project site as follows.

Project site A

On project site A, the observers noted that excess materials that could be likened to be wastes were enormous on the site. After the initial site visit, dialogues were held with the workers on the sites and a subsequent visit indicates a slight improvement of the state of housekeeping on the project (Figure 1 and 2). Notable issues that emanate from the observations include the non-classification of wastes on site and poor storage of materials; blockage of the walkways by reinforcing bars from demolished wall; lack of proper working methods that bring electrical cables into close contact with flammable liquids; and wasteful use of materials due to defects, rework and poor workmanship.

In particular, the observers noted that a waste disposal was situated along the walkway to the site and excess materials were all over the site. These two issues were further interrogated in the focus group interviews with the site agent and three workers on the project. The interviewees were requested to the state reason why the walkway was blocked by wastes and materials that were lying around. From their responses, it was clear that there was no division of work regarding different tasks in line with specific job description, so proper placement of materials and waste seems to be suffering. No

one took responsibility for housekeeping. In addition, the interviewees say that there are too many foremen that claim the same authority to the extent that one foreman cannot over rule another. For example, the workers suggest that they often get instructions from different foremen with different tasks to perform. When such instruction is given, the workers will leave some tasks uncompleted and in so doing, tools or material will be left lying about to the detriment of proper housekeeping. In his own part, the site agent states that having too many foremen on site leads to lack of planning or deviations from plans as every foreman plans his tasks his way to suit his targets in relation to the work programme.

Similarly, the interviewees were asked to comment on 'excess materials' and its impact on housekeeping on the project. For this question, two foremen comment that material management issues that consistently occur on the project are responsible for the excess. They agree that having excess materials on site have escalated storage facility issues and negatively affected housekeeping on the project. The foremen also say that 'fear of running out of material stock' is fuelling the presence of excess materials on the site. They cited an incident that nearly got them dismissed from the project. The main problem happened when the site ran out of course aggregates due to unexpected weather conditions that disrupted supply and work plans. Apart from official reprimand, the foremen noted that the mistake of running out of materials impacted upon their income so much that repeat situations have to be avoided. In other words, they opine that having excess materials on site always protects them from troubles and they further say "So it is a good thing to do, even to address or prevent variation caused by inflation."

Project site B

On project B, it was observed that the walkway was also blocked with materials and wastes because of lack of appropriate instructions from the foreman. It was recorded that signage that would have alerted workers and the general public to hazard were missing on this particular project, and it appears that the municipality that is supposed to intervene ignored the situation. Another major issue on this site is improper work sequencing as the field observers perceive that the 'workers do the second activity before the first activity': working backwards. More worrisome is the fact that materials were not stockpiled, wastes were on every space on the site, and the lack of control over where waste must be dumped was clear. These issues contributed in no small measure to the state of housekeeping on the site and they form the basis of the interviews that were conducted with 2 personnel on the project, an H&S officer and a senior foreman.

The interviewees were requested to give reasons why wastes were not classified on the site where aggregates are left to mix with each other: flammable liquids such petrol were mixed with live electrical cables; and reinforcing bars from the demolished concrete elements were left projected and blocking the walkway to the extent that people could trip and become injured. On his part, the H&S officer report that he had instructed cutting of the reinforcing bars that constituted clear hazard on the walkway, but the instruction is awaiting execution because of the non-availability of required equipment to do the job because a grinder to be used has to be transferred from another site in Masaru, Lesotho. The foreman on the site provide additional information when he mentioned that the reinforcing bars have been in the state of 'protrusion' which constitute an hazard for almost a month, although the H&S officer kept on requesting their removal. The site agent said that the bars should just be bent

due to lack of tools. Such a response from the site agent is a symptom of ineffective management practices that is contributing to the malaise. While recognising the danger in having such protruded bars in a walkway, the site agent indirectly mentioned the 'not so positive' role that the managing director of the firm is playing with the situation. The agent noted that despite notifying the managing director of the small and medium sized firm of the need to clear the site of the reinforcing bars, required actions are still pending.

Project site C

The field work on project site C equally highlight lack of storage facilities on the project and more concerning is the surplus workers' toolboxes that can be seen in multiple locations on the site. The site is also crowded with workers because of lack of space for doing the necessary work. In fact, bulk materials for the project were stockpiled offsite and when needed, their transportation to the site is not handled properly. On this project, the observers were also able to interview an H&S officer and a foreman. The interviewees were requested to explain why the storage facility was so far from the site because there was no storage on site. They were also asked to explain why wastes were not properly disposed of or even classified and stored properly. The two interviewees responded that apart from space issues, the storage of aggregates on site cannot be easily done because of the wind due to the fact that the project is an extension of an operational shopping mall. For example, it was noted that aggregates would produce dust that would affect people or operations of the mall. The foreman said there were gaps in the planning of the work because they have to store a very small amount of aggregates to be used only on site to the detriment of productivity and H&S. The interviewees were concerned about their experience regarding the disposal of waste materials. For instance, they mention that for a plant or truck to dispose wastes a lot of time is wasted because there is a usual lengthy and unnecessary paper work to be completed.

Project site D

In the final project observations, it was noted that yet again, the lack of storage facility due to minimum space on site is a major problem. The workers in this particular project appear to be incompetent as they tend to forget service ducts (that often have defects) prior to installation and even after installing them, correction was still needed. These ducts litter the entire site. On this same project, overcrowding of workers in a limited space was observed. Such situations heightened motion / mobility needs that do not contribute to the realisation of activity completion. For instance, some workers would walk about pretending to be searching for items while hoping another worker would complete their portion of assigned tasks. A major hazard observed on the site is the chaotic locations of electrical cables and water pipes, which portend danger on the site. This is clearly a case of poor space management and site layout.

These issues were further assessed through the interviews that were conducted 'post observations' on the site. Although only one foreman made himself available for the follow-up interview on this particular project, his comments could be deemed to be credible as he doubles as the H&S officer on the project. The foreman was requested to explain why the site is not clean and lack safe access due to wastes and raw materials that are blocking walkways to the extent that even the emergency assembly point was blocked. The foreman responded by saying that the site has a problem of communication, especially between the principal contractor and the subcontractors. For instance, the subcontractors tend to always place their materials at any spot of

their choice because they do not have to report to him directly. In fact, the foreman mentions that there are lot of subcontractors on site with similar tasks, so it is a little bit difficult to manage them because they always blame each other: "For example, one will leave empty cement bags lying around site and I tell them to properly dispose, they will point each other and put a blame." Another major issue that the foreman highlight is quoted verbatim as " One other problem is our company‘s policies and subcontractors and policies of not being the same, we paid our people daily rates while subcontractors pay them as per work done or covered, so after work when we clean the site, subcontractors do not clean but they keep on working to cover a lot of work as to increase their money. So they keep on increasing waste without reducing it. There is no one to talk to directly on site because the managers are not there, we only talk via phone to report, he will just agree but nothing will change. All they are interested in is money. As long as they produce a lot of work that’s what matters. The manager is always not always on site, he is interested in production too in order to claim big payment certificates."

Figure 1: Illustration of pre focus group interview project site observations

DISCUSSION

As shown in Figure 2, there appears to be an effort to clean up the visited construction sites after the focus group interviews were concluded. While other factors may be responsible for the sudden improvement of the housekeeping conditions of the four project sites, the shared information during the focus interview sessions may have somehow influenced a change in the photographic evidence. When the data collection exercised ended, the 5-Why analysis was conducted to further illuminate the issues contributing to the current situation. The 5-Why analysis is a problem solving tool that helps a team to identify the root causes of a problem without statistical calculations (Andersen and Fagerhaug, 2006). It involves looking at a potential cause of a problem and asking 'why' and 'what' lead to this problem many times. For this study, Figure 3 shows the possible qualitative causal pathways that may be responsible for the pervasiveness of poor housekeeping on construction sites in Lesotho.

Essentially, by using the 5-Why analysis, the reasons why housekeeping is a continuing challenge in Lesotho construction could be discerned from the focus group interviews. The changes shown in Figure 2 may have occurred with the aid of candid dialogue using the 5-Whys based on the fact that non-compliances have been observed

(Santorella, 2010). The non-compliances clearly deviated from how people should act on construction sites (Glendon and Litherland, 2001). The challenge from the study is about "getting people to want to act in ways that are safe" regardless of the perceived effects of such safe actions (Santorella, 2010). There should be no place for 'indifference and complacency' in a hazardous work environment (Figure 3). While enforcement has a key role to play in ensuring a safe work environment in the construction industry, bad behaviour of everyone involved in site work should be discouraged (Glendon and Litherland, 2001). This is relevant in a context where compliance to regulations appear to be lax (Kheni *et al*., 2008). The noted changes in Figure 2 confirm that behaviour-based safety (BBS) techniques are very effective in bringing about improved performance in construction site housekeeping (Lingard and Rowlinson, 1998).

Figure 2: Illustration of post focus group interview project site observations

The changes in Figure 2 were recorded few weeks into the fieldwork without a major intervention from concerned regulatory authorities. In other words, it is important to amplify the use of attitude and behavioural tools to engender safety on construction sites (Lingard and Rowlinson, 1998). When danger is not imminent, such tools could improve the status of construction safety and some of the tools include asking everyone on site to recognize the safe behaviours of others, that is, keeping a work area clean and hazard free (Santorella, 2010). Clearly, Figure 3 implies that a culture change is necessary on the researched projects and discipline alone cannot be used.

Rather, the leaders in the industry and the firms involved in the specific projects would have to go beyond compliance requirements and provide the leadership, which would build up a new culture where everyone care about safety on project sites (Hafey, 2015). In a developing country context, it appears that compliance-based safety would have to be complemented by BBS before a substantial improvement could be propagated.

CONCLUSIONS

This paper shows a practice that produces poor housekeeping on construction sites in Lesotho. The apparent indifference and self-righteousness of workers, foremen, site agents and H&S officers on the four projects highlight a major question: "how do we get people to care about safety".

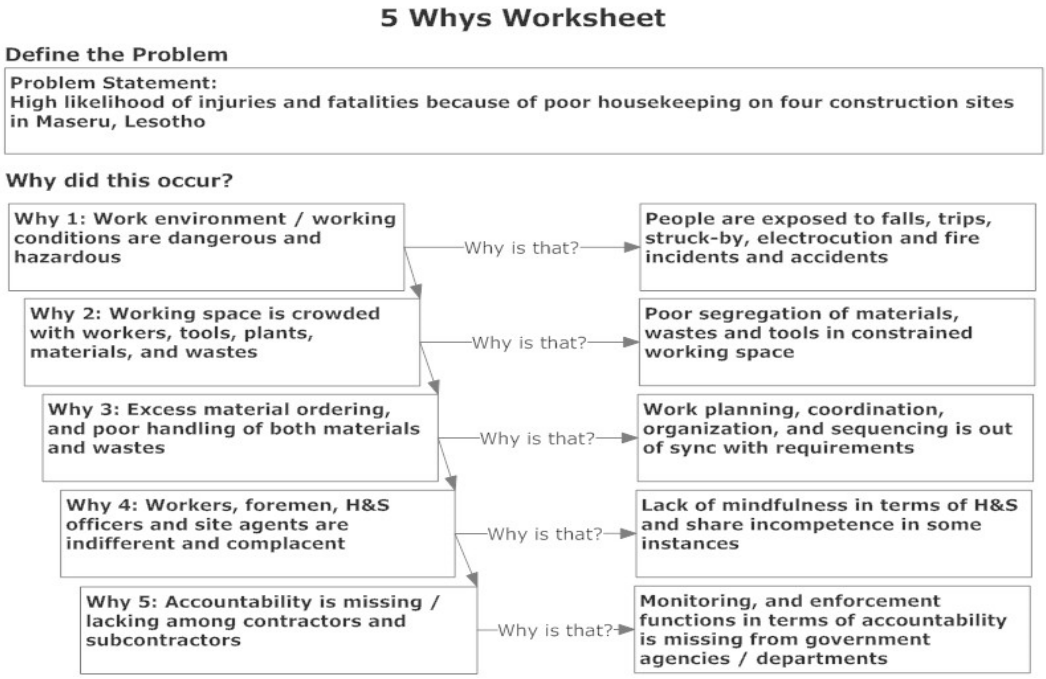

Figure 3: 5-Why illustration of causal factors observed from the housekeeping study

This question is relevant in an environment where other excuses or considerations always preoccupy the minds of site operatives when non-compliance is observed and interrogated. Proper work planning, sequencing and site layout that is backed up with open communication would make changes on a site even if space is constrained. Providing a safe access to sites by keeping all walkways clean and tidy through appropriate handling of materials and wastes should be a priority on every construction site anywhere in the world. Among the site operatives, the contributions of foremen to current practice could not be ignored. The control of work spaces on site by foremen impact upon activity completion and the state of a site. In the researched projects, the foremen were not able to handle space issues and the management of subcontractors. These lapses could make a difference on the projects in terms of safety. Even though in this study, the site operatives tried to minimize the major issues that were observed after dialoguing with them, there is a need to verify if the driver of the change is compliance to regulations or a change in culture in Lesotho. A future study would assess the reason for the improvement while assessing how to get people to care about construction site safety in Lesotho.

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