A Study to Investigate Safety Practices in Sri Lankan Construction Industry

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Abstract: This study investigates the safety practices that are currently adopted in the construction industry with a view to improve them. Existing regulations governing construction were examined, accident data was analyzed to find the groups at risk and, causes. Questionnaire surveys were conducted to find out the problems and, constraints faced by the personnel involved that do not come to light through the literature. Study found out that the lack of effective legislation, lack of funds, negligence and, unawareness being the main reasons for poor safety conditions. Finally, recommendations were given to overcome the challenges.

Keywords: Construction safety, performance improvement, Sri Lankan construction industry.

1. INTRODUCTION

Safety is an important consideration in every industry. When it comes to construction, safety should not be taken lightly since the likelihood of an accident occurring is higher than other industries. Which is a fact that known globally and, which is applicable to Sri Lankan context as well. Also, unlike other industries, accidents in construction are wide ranging and, diverse. However, in Sri Lanka safety is often overlooked by contractors and, regarded as a cost rather than a cost prevention mechanism.

Since sound safety measures can reduce the risks, it can considerably impact the overall cost. Also, the delays and, other expenses following an accident are usually much higher than the original cost of instituting and, maintaining safety standards.

Negligence and, not complying with the safety measures recommended by the relevant authorities can be considered as the main causes behind most of the construction accidents in Sri Lanka. Furthermore, most of the accidents are not monitored and, reported because of the reluctance of the contractors. This fact has been aggravated due to the limited safety legislation in Sri Lanka, particularly for health and, safety of the workers at construction site.

1.1. Problem definition

Importance of safety in construction has been emphasized by many researches previously. All of the stakeholders involved identifies and, accepts that safety should be given a great prominence in construction work. But in reality, the health and, safety standards prevailing in the construction industry of Sri Lanka are poor. This may be due to lack of funds, lack of attention, poor commitment of stakeholders, lack of education and, negligence. Therefore, this research focusses on the standards/legislation governing the safety in construction industry of Sri Lanka, what is being practiced in reality at sites and, the reasons for the gap.
2. OBJECTIVES

Following are the objectives of the study.

1. To conduct a thorough literature survey to investigate;
   a. The nature of the accidents occurred in the construction industry
   b. The legal aspects governing the Health and, Safety of Sri Lankan construction industry
      and, their drawbacks
   c. Identify the gap between set standards and, standards actually applied in practice

2. Conduct questionnaire surveys to gain insights to worker and, management attitudes towards safety

3. Identify various constraints and, issues related with successful implementation of safety procedures

3. LITERATURE SURVEY

Health and, safety is still a low priority in many South Asian cultures including Sri Lanka. It is mainly due
to the provisions are costly and, have no immediately quantifiable benefit. According to Levitt et al.
(1981), accidents costs recorded in construction companies in the USA were found to be as high as 3%
of the total construction project costs.

Costs of accidents could be categorized into direct costs and, indirect costs. In his study Pillay (2014),
has expressed that direct costs of the accidents amounted to 30.59% of the total project costs. While
the indirect costs could be six times as expensive as the direct costs. It should also be noted that
accidents arising from poor health and, safety measures would have long term effects on the
organization such as impaired company image, loss of reputation and, loss of market (Gosselin, 2004),
which would have an even greater adverse financial impact than the above mentioned costs.

Hinze (2005) categorized construction accidents into eight basis groups, which are (1) Fallen from
heights (2) Struck by falling objects, falling materials, moving vehicles, equipment, vertically hoisted and,
horizontally transported materials (3) Excavation related – collapsing of soil, nearby structures. Toxic
gases and, fumes, water inrushes at bottom of excavations 4) Accidents caused by machinery and,
unsafe tools (5) Electrocution (6) Fire/explosions (7) Failure of temporary structures such as scaffolding
and, formwork (8) Other – exposure to harmful substances, lightening, slipping

Langfoul et.al (2000) identified psychological and, environmental factors behind construction
accidents. Some of the psychological factors are; Care and, attention by the individual, Skill and,
experience bought to the job, Quality of safety training obtained, Accuracy in evaluation of subjective
risks and, perceived responsibility. The environmental factors consist of Site condition, Site tidiness,
Availability of technology and, resources, Cooperation of groups, Control and, supervision of work.

Halwatura and Jayatunge (2012), have identified the most severe risk factors in the Sri Lankan
construction industry as lack of supervision, lack of training with respect to health and, safety for workers,
lack of training with respect to health and, safety for technical staff, reluctance of workers to adopt health
and, safety measures, lack of health and safety instruments, poor site supervision, working shift
extending beyond eight hours, absence of health and safety audits, ignorance of health and safety policy
and, lack of focus on health and, safety by the client.

More than 90% of the accidents in construction industry of Sri Lanka occur due to unsafe acts or
behaviors. The common unsafe behaviors found in the industry are, working with moving machinery,
working without personnel protective equipment, operating without authority, wearing loose clothes,
unsafe lifting, carrying and, placing, using hands instead of using tools, unsafe handling of hazardous
materials (Ahamed et al., 2011).
3.1. Analysis of safety regulations in Sri Lanka

Factories Ordinance No.45 of 1942 is the main health, safety and, welfare legislation effective in the country. It was last updated by Factories (Amendment) Act No.19 of 2002. It is noted that Factories Ordinance has not been updated for over a decade. Hence, presumably new construction technologies and, standards that have emerged in the recent years might not be covered by the provisions. The Factory Ordinance is designed for all industries and, is not construction specific.

In almost all countries there are legal bodies which enforce occupational safety regulations for construction. In countries like UK (Construction Design and Management Regulations 2015), USA (PART 1926 OSHA regulations), China (Construction Law of the People’s Republic of China), UAE and, India (Building & Other Construction Workers Act, 1996) there are dedicated safety regulations/acts for the construction industry, unlike in Sri Lanka where there are no special safety regulations governing the construction industry.

Additionally, Factories Ordinance suffers from shortcomings such as limited coverage of construction work, subjective statements, lack of description, lack of practicality, lack of numerical expressions and, unorganized presentation. Therefore, there is a necessity of a comprehensive and, updated health and safety regulations governing Sri Lankan construction industry. When considering the amount of accidents, it can be highlighted that effective legislation is vital to implement a safe work environment in construction.

3.2. Analysis of previous accident data

Accident data statistics related to construction industry were obtained by the Industrial Safety Division of the Department of Labour. An updated list is presented on the accidents that were reported to the division, which thus far were not presented by existing literature. Detailed records relating to fatal accidents were only available in the year 2015 and, it was analyzed based on occupation, age and, type of accident.

As mentioned in the accident register in the Department of Labour the main reasons for the accidents are

1. Lack of supervision
2. Lack of knowledge and, awareness
3. Bad work practices
4. Unsafe fencing
5. Improper use of PPE

However, the numbers mentioned in this analysis do not represent the actual statistics, but the number of accidents reported to the Department of Labour. The 2013 performance report of the Labor Department states that only 3.5% employees have reported accidents. (Darshana, 2016).

The data, given in accident register in the Department of Labour, in the years 2000-2015 the average percentages of accidents pertaining to construction were 31.7% for fatal accidents and,2.79% for non-fatal. As a result, construction accounts for one third of the fatal accidents that have occurred in Sri Lanka and, a very low figure of the non-fatal accidents. It is further possible to analyze by taking the fatal to non-fatal ratio.

As a result, when an accident occurs in construction there is a 61% of likelihood (average percentage) of it being fatal, but in other industries the figure is only 3%. Hence, this proves how dangerous construction is compared to other industries.

Analyzing causes and, work groups affected (in year 2015), labourers are the work group with highest risk and, falls have accounted nearly for half of the fatal accidents. Therefore, in safety training programs and, safety planning this work group and, prevention of falls should be given prominence.
A breakdown of the fatal accident data relating to the year 2015 is shown below (regenerated using accident data given in accident register in the industrial Safety Division, Department of Labour).

**Figure 2a Causes of Fatal Accidents (2015)**

**Figure 2b Fatal Accidents by Occupation (2015)**

According to figure 2a and 2b, labourers are the work group with highest risk and, falls from heights have accounted nearly for half of the fatal accidents. Hence, in safety training programs and, safety planning this work group and, prevention of falls should be given prominence.
4. METHODOLOGY OF THE STUDY

As the initial step a literature review was performed to learn and, familiarize with current knowledge available regarding the problem. Also, to assess the existing local legislations and, standards pertaining to construction. Furthermore, available accident data were analyzed to understand the root causes behind the accidents. Data relating to accident statistics in the recent years was gathered through the Industrial Safety Division of Department of Labour to aid in the analysis.

Discussions were held with relevant personnel in the industry in order to understand the problems faced by them in reality that cannot be assessed by literature. This involves both workers and, the management of construction. Questionnaire surveys were developed based on the objectives and, the literature review. Two separate questionnaires for the staff and, workers were developed in order to identify shortcomings and, improvements in safety.

5. QUESTIONNAIRE SURVEYS

The investigation was limited to building construction industry for several reasons. First, building construction encompasses vast range of different stages unlike other industries such as roads. Also, the accidents that occur in building construction are found in other work too. Secondly, building construction is the most common industry and, most of the accidents that occur in the construction sector are related to it. Thirdly, since this investigation had to be performed individually within a limited time span, which lead to a difficulty in accessing other sectors in construction. Which was the same reason the selected list of companies (contractors) were of ICTAD grade C2 and, higher, since most of the other grade contractors operate from outstation.

5.1. Survey for workers

Data was gathered from 41 respondents and, majority of them were labourers (71%), since this is the target group mostly at risk and, majority (37%) had work experience of less than 5 years. The following figures (figure 3a and, 3b) provide a breakdown of their experience, type of work performed (job title).

![Worker Questionnaire - Job title](#)

![Worker Questionnaire - Experience](#)

Figure 3a Worker Questionnaire-Job Title  
Figure 3b Worker Questionnaire-Experience

Majority (59%) of the workers interviewed are of the opinion that safety wears would fit in the Sri Lankan climate. They agreed that that there is very less possibility for safe modifications. 68% of the workers stated that they would have a greater flexibility in working without wearing PPE. But at the same time agreed that PPE are essential for personal safety. Nearly two thirds of the workers interviewed were of the opinion that they have been provided with the appropriate PPE for the task. But researcher observed that provided PPE were not the recommended. This shows lack of awareness and, knowledge among workers. More than two third of the workers expressed that the safety wears they have been provided were of poor quality.
Over a half of the workers stated that, their superiors acted in a responsible manner with respect to health and safety (eg: obeying safety rules at site). It was also found out that that management is neglecting the suggestions from people of low hierarchies in the organization with respect to health and safety. This would create a demotivating effect and, hence there is a less likelihood of suggestions emerging from the people who are constantly involved with the work.

Majority (61%) have stated that they had received adequate training and, confident in carrying out specific tasks, 78% of workers also stated that safety precautions would not hinder their normal working practices. But whether they follow the precautions remains obscure.

Majority of the workers were of the opinion that management need not give any more attention to safety than currently given. Most of the workers who responded otherwise were either more experienced workers or workers from organizations with lower ICTAD grade.

5.2. Survey for management staff

Data was gathered from 53 respondents from a variety of occupations. In addition to overall response, the responses from persons from managerial positions, engineers and, safety officers were separately analyzed in percentage basis (figure 4).

![Staff Questionnaire - Job title](image)

**Figure 4 Staff Questionnaire-Job Title**

Overall majority, 56% of managers and, majority of engineers and, safety officers stated that amounts allocated in BOQ to implement safety measures was insufficient. But organizations having grading of CS2 and, above involved in large projects said that the amount is adequate. At the same time, more that 50% of overall, engineers and, managers stated that allocating considerable amount for safety would not be financially beneficial.

More than 87% of all parties mentioned that they have safety manuals and, procedures. But only 64% of overall and 39% of engineers stated that the company has an up to date safety policy, which is a mandatory requirement by legislation. At the same time majority stated that their company does not have program to monitor sub-contractors’ safety performance. Notably they were from organizations below CS2 grade.
More than 80% of all parties stated that health and, safety meetings held regularly. and, action is taken regarding matters discussed. But considering manager's response 62% of them agreed that they seldom discuss safety matters in top level meetings. More than 50% of all parties mentioned that on average it takes 1-2 weeks to rectify a safety related problem bought to notice.

Overall, 57%, more than 60% of managers, engineers and, safety officers stated that workers are negligent in adapting safety measures at the same time majority of them accepted that workers do have the knowledge and, ability to understand the importance of adapting safety measures.

55% of overall, 69% of managers and, majority of engineers and, safety officers stated that the client is not willing to accept some responsibility in case of an accident. This was mainly evident in small and, medium scale projects. Majority of engineers and, safety officers asserted that involvement of legal authorities toward safety is not enough. But managers stated otherwise. But from an overall point, respondents stated that authorities should involve more actively than present.

6. CONCLUSIONS

Unlike other working environments construction projects have very volatile environments, both physical and, personal. Each project presents different risks. However, safety, health and, welfare is a neglected subject in many of the construction sites in Sri Lanka. As construction industry contributes considerably to the economy in developing countries like Sri Lanka much consideration have to be given to this vital issue.

Most prominent fact revealed by contractors was financial problems. Lack of funds was identified as the leading cause of poor health and, safety in organizations with ICTAD (CIDA) grading lower than CS2. As identified by the questionnaire survey majority of the contractors were of the belief that allocating additional amounts for health and safety would not be beneficial from a financial perspective. So, most were reluctant to allocate a sufficient amount for health and safety in the Bill of Quantities provisions. They believed that it is at the discretion of the client and, the client should bear the cost of additional provisions. This was mainly apparent in small and medium scale projects which are mostly handled by contractors having lower grading. They also claimed that in that market segment there is intense completion due to a higher number of contractors and the client is cost conscious, rather than quality and, would opt for the least cost bid paying little or no attention to safety related provisions. This was not apparent in higher graded organizations who are usually involved in large scale projects, since the project involves large amount of money, safety related provisions would equally be increased.

The existing legislations and, standards developed by authorized bodies in Sri Lanka are insufficient to cover construction comprehensively. Also, the existing regulations need to be updated. This was highlighted in the analysis of “Factories Ordinance” with OSHA 1926. Also, the involvement of authorities to improve the safety condition seems to be inadequate. This has resulted in loose control measures giving the contractors the freedom to operate ignoring or paying little attention towards safety.

It was also identified that workers and, other technical persons, especially workers have poor knowledge and, training with respect to health and safety. The poor attitude of workers towards safety and, negligence makes the situation worse. The negligence and, complacent attitude of workers might be due to lack of awareness and, proper training. This is partially due to the organization culture as well. If the organization cultivates a strong health and, safety culture it would prevail over personal attitudes and, would even result in altering the attitudes. But as identified by the questionnaire survey since the management is of the opinion that giving considerable attention towards safety would not be financially beneficial such a culture would hardly prevail. This is greatly reflected by the lack of a safety policy in most of the lower ICTAD graded organizations.

Lack of involvement of safety related staff is also a shortcoming in construction in Sri Lanka. As illustrated in the questionnaire survey most of the managers were unaware whether their safety officers/supervisors have received health and safety education or training. Due to being unable to involve proper staff coordination of health and safety procedures become difficult and, would lead to improper planning and, execution. Also, informal discussion revealed that though (as in the responses of the questionnaire survey) staff were aware of health and safety manuals and, procedures, the workers who are the group at most risk seems to be completely ignorant about such measures. This implies that
safety related communication is ineffective, since the intended messages are not delivered to the intended group.

Additionally, the following reasons were also identified leading to poor safety and accidents.
- Difficulty in retaining experienced workers due to low salaries and, the fluctuating workforce mainly comprising of inexperienced workers
- Unfamiliarity of modern construction tools and, work practices
- Involvement of sub-contractors who have direct control over workers
- Low level of importance given to safety. Perceiving safety as distinct from work practices rather than integrating into them.

7. REFERENCES


Huang, X., Hinze, J., 2005. Owner’s Role in Construction Safety


Pillay, K., 2014. The Costs of Construction Ac-idents

W.D. Darshana, (2016), Improvement of Health and, Safety in Construction Sites in Sri Lanka