A Survey on the Implementation of Safety Standards of On-going Construction Projects in Cagayan de Oro City, Philippines

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Abstract

A survey using structured questionnaires and actual field visits was conducted to various on-going projects in Cagayan de Oro City in the year 2011. A total of 375 respondents from 36 contractors were subjected to the questionnaires which included project managers, project engineers, foremen, carpenters, masons, equipment operators, welders, steel men, electricians and laborers. Apart from the data obtained from questionnaires, actual field visits were conducted to gather further information using the checklist of Occupational Health and Safety Standard practices of the Department of Labor and Employment's Department Order No. 13. Results revealed that in actual field condition, the standard safety practices were poorly implemented and in most cases, the standard safety requirements were just taken for granted. While the contractors were obliged to do their part in educating and promoting 'health and safety' practices in the construction sites, this study proved otherwise.

Keywords: construction, construction management, safety, health and safety, health and safety in construction, occupational health and safety

1. Introduction

There is a booming construction activity in almost all major cities of the country, including Cagayan de Oro City. As part of the development, the most cities today are facing the challenges of urbanization. Several infrastructure developments are already taking place and some are in progress of construction. These include: bridges, flyovers, malls, high rise buildings and other structures.

While Cagayan de Oro City is enjoying the progress brought by the development, through infrastructure, it is sad to note that construction projects are not implemented safely over these years. Construction is still one of the most dangerous land-based work sectors in the country. Fatal accidents such as falls from height, accidents involving construction equipment, excavation accidents, electrocution, and being struck by moving objects are still the common causes of accidents in the construction industry (Anon, 2011; Bianca, 2011; Bumpress, 2011).

These fatal and serious injuries happened because the construction industry does not have enough people that have been trained to oversee safety (Grace, 2010). Most contractors choose to ignore safety assurance system (Susak, 2018; Argy, 2010). While the government is trying to push the Occupational Safety and Health Standards for the last few years (Laguesma, 1998), it can be noted that such compliance is not improving the accident rates in the construction industry (Anon, 2009; Swanson, 2011).

This study focuses on the actual implementation of Safety Standards required in the Construction site. The area of focus is in Cagayan de Oro City, of which it can be also noted that it may be what other cities of this country are also doing.

The aim of this study is to assess and evaluate the construction companies (Contractors) in Cagayan de Oro City in their implementation of safety standards in their projects. Specifically, the following objectives are considered:

1. To assess and evaluate the safety conditions and practices of construction workers the project site while project is on-going;

2. To promote safety standard procedures in actual implementation of the project site.

2. Methodology

This study uses qualitative method of research through a structured survey questionnaire and checklists for a safe environment at the worksite. The questionnaires were distributed to construction workers, which included: laborers, carpenters, masons, electricians, foremen, engineers and managers.

In order to address the first objective, respondents were visited on the actual construction sites and data were collected through the questionnaires.

As to the second objective, the findings and results can help the researcher to draw potential recommendations to promote the safety standard practices in actual implementation of the project site.

3. Results and Discussion

This study has involved thirty six (36) construction firms in Region 10 of which 30 of these firms were located and had the project constructed in Cagayan de Oro City. It includes 23 companies with vertical structure projects and 7 firms with horizontal structure projects.

A total of 375 construction workers were being surveyed for this study. The respondents included two (2) project manager, five (5) engineers, two (2) safety staffs, six (6) heavy equipment operators, three (3) crane operators, three (3) electricians, twenty four (24) foreman sixty nine (69) masons, seventy nine (79) carpenters, eighteen (18) steel men, twenty three (23) welders and one hundred forty one (141) laborers. These respondents were taken randomly upon visiting and observing different on-going projects in the city.

Safety training and seminars are presented in Table 1. It shows that 124 respondents had participated safety training and seminars especially the pre-construction safety training which was conducted before they start to work the project. However, 144 of these respondents have not undergone safety training and seminars.

A large percentage (38.40%) of the workforce has not attended training and seminars on safety. This means that a large number of workers are unaware of the dangers that are based on them in the worksite. There is a serious need for the workers who are currently working in the jobsites to undertake safety training and seminars in order to provide guidance and protection at their respective workplaces.

Table 2 shows the skills certificates that the construction workers had. The heavy equipment operators presented their TESDA certificates thereby proving that most construction operators of heavy equipment in this city, are capable ofdoing their jobs. This also provided insights that contractors are hiring qualified equipment operators through the presentation of certificates.

Table 1. Safety training and seminar acquired

Training and Seminars	Frequency	Percentage
Fire Protection Seminar	17.00	4.53
First Aid Seminar	17.00	4.53
Safety Training Methods	58.00	15.47
Safety Management Technique	13.00	3.47
Crane & Elevator Safety Inspection	2.00	0.53
Pre-Construction Safety Training	124.00	33.07
No training/seminar attended	144.00	38.40

Table 2. Skills certificate acquired

Skills Certificate	Frequency	Percentage
Heavy Equipment Operator	6.00	100
Crane Operator Certificate	3.00	100
TESDA Certificate	60.00	28.17

Penalties for violating safety practices were presented in Table 3. There were 231 respondents that had worked in the construction project site with safety program. It was shown that the common penalties the construction workers get for a first offense was they were warned and not allowed to work on site, while for second offense was still warned and not allowed to work on site but some also said that they were suspended for the second offense. In the third offense, some say that they were suspended and, others say that they were terminated in their work without any benefits taken from the company.

This practices are typical practices for penalizing workers who commit violations in worksites. However, it is noted that penalties were applied when accidents already happened. Employers are quick to pinpoint the blame to the workers who already had an accident. For non-fatal accidents and injuries, it is easier to blame the injured for committing the safety violation, thereby, imposing the penalties would only “add insultto the injury”.

It is important that violations should not be taken for granted in order to impose on the workers the importance of safe practices in the workplace, because what they are protecting in return is their own lives.

Table 3. Penalties for violating safety practices

Penalties	Frequency	Percentage
First Offense		
Warned but still allowed to work on site	0.00	0.00
Warned and not allowed to work on site	79.00	34.19
Suspension	50.00	21.65
Second Offense		
Warned but still allowed to work on site	0.00	0.00
Warned and not allowed to work on site	67.00	29.00
Suspension	62.00	26.96
Termination	0.00	0.00
Third Offense		
Warned but still allowed to work on site	0.00	0.00
Warned and not allowed to work on site	0.00	0.00
Suspension	67.00	29.00
Termination	62.00	26.96

The survey identified four common injuries that usually happened in the worksite. These were wounds (due to accidental cuts from sharp tools, etc.), abrasion, bruising, and punctured by nails. In Figure 1, the most common injuries experienced by the respondents during the execution of their work at the construction sites is presented. The most common injury is punctured by nails at 79.73%. Followed by abrasion (74.13%), wounds or cuts from sharp objects or tools (72%) and bruise due to hitting hard objects at the worksite (61.60%). Others injuries that were experienced by some of the construction workers were laceration, burns and electrocution. The fracture usually happens during a fall accident. These injuries were experienced by the workers who did not use personal protective equipment while working on the site.

It should be noted that several cases of injuries have been observed, especially when workers were allowed to work without proper protective equipment (PPE). This finding provided confirmation that contractors have a lax attitude in dealing with worker safety precautions and use of PPEs. The highest cause of injury recorded is on punctured by nails. This could have been prevented by simply wearing a pair of steel toe shoes. Further observations at work the site, confirmed that workers are allowed to wear rubber shoes and even sandals for work.

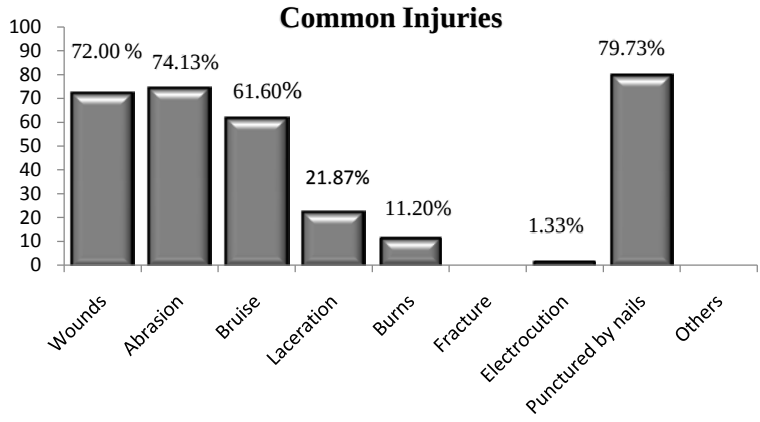

Figure 1. Percentage of common injuries experienced by the respondents at the construction site

To understand the situation at the worksite when accidents happen, a question on who administers first aid was asked. In Table 4, the person who had given medical attention to the injuries of the construction workers is presented. More than half of the respondents say that no one treat their injuries but themselves. The result showed that only few construction sites in Cagayan de Oro City had an attending nurse or first aider in the project site. It is evident that medical personnel are usually not a requirement in construction sites. Contractors do not provide medical personnel assistance to the injured workers on the site. This is prevalent in most cases that only co-workers were the ones who help the injured.

Table 4. Frequency and percentage of personnel who gave medical attention to the injured worker

Personnel	Frequency	Percentage
Nurse/First Aider	57.00	15.20
Co-worker	104.00	27.73
None	214.00	57.07

Table 5 shows the safety practices that the construction firms should do on daily basis, such as toolbox meeting, physical exercise and checking of personal protective equipment. In the current situation, toolbox meeting is a

Table 5. Safety practices that should be done daily

Safety Practices		Frequency	Percentage
Toolbox Meeting	Daily	82.00	21.87
	Oftentimes	79.00	10.40
	Never	254.00	67.73
Physical Exercise	Daily	50.00	13.33
	Oftentimes	22.00	5.87
	Never	303.00	80.80
Checking of PPE	Daily	50.00	13.33
	Oftentimes	41.00	10.93
	Never	284.00	75.73

practice that is not common to the contracting activity in the field. It was noted that only 21% practice daily toolbox meeting at the worksite. While a large number (67%) did not engage in this practice.

Physical exercise as a routine in the worksite is not being practiced by workers. One of the reasons, is that most workers will be doing more of their physical activities during the entire day's work. This normal job, in fact, are activities that are more exhausting for workers, thus physical exercise routine can be eliminated in the daily program.

Interestingly, checking of PPEs is not performed in most of the workers at the job sites. Somehow, there is a neglect on the contractors' part in looking around for minimizing the risks of accidents of its workers. One sad part of this study is the confirmation that the safety of workers is being neglected by the construction site managers and engineers.

Table 6 presents a tabulation on managing risks. It was noted that 24 construction sites had a boundary fence. Seven companies had a poster and safety signs and warnings, six companies had a toolbox meeting every morning, three companies had a fence for excavated areas and openings, proper storage and labeled of materials and arrangement in collecting and disposing of waste and two had a first aid kit adequately stocked. Only one company had posted their emergency telephone numbers.

It is noticeable that perimeter fence is usually constructed round the boundary of the construction site. Basically, it is always done so because it is

Table 6. Risk management on the hazards in construction area

Managing risks at the construction area	Frequency	Percentage
Poster and Safety signs/warnings	7.00	25.00
Toolbox Meeting	6.00	21.43
First Aid Kit	2.00	7.14
Emergency Telephone Numbers	1.00	3.57
Boundary Fence	24.00	85.71
Fence for excavated areas and openings	3.00	10.71
Proper Storage and Labeled of Materials	3.00	10.71
Arrangement in collecting and disposing of waste	3.00	10.71

always a payitem (perimeter fence) such that contractor will always construct this in order to get paid. Other than being a paid item, perimeter fence prevents outsiders to roam around the project site causing dangers to them or preventing untoward incidents such as thief of materials, workers property and others.

While it is considered a need in the project site to require all workers to use protective personal equipment at all times, not all workers are doing so (see Table 7). Site observations have confirmed that not all workers at the construction site are observing the strict rule of 'Safety First" as the slogan of the Construction Industry. The use of hard hat is one necessary requirement for construction workers. But construction managers do not give this with an utmost attention. The same is true to other personal protective gadgets needed for the job. One of the reasons for tolerating workers without protective gears at work is the confusion on who provided these items to workers. While big construction companies provide protective gears, other small-scale companies are asking their workers to provide for their own.

This is where tolerance comes in because most often, workers failed to provide for their own because of lack of financial capability due to low wage rates. In other cases, it can be seen that some workers are using broken hard hats, damage shoes, etc. Just for the sake of wearing them, but not for the purpose of protecting them in case accidents happen.

In high structure projects, it is necessary to provide control measures for fall protections. Observations at the worksites confirmed that only few contractors are concerned with safety for workers at elevated projects.

Table 7. Usage of personal protective equipment

2-5: Personal Protective Equipment	Frequency	Percentage
Safety Helmet	10.00	35.71
Eye Protection	5.00	17.86
Ear Protection	3.00	10.71
Face Shield	3.00	10.71
Safety Vest/Jacket	3.00	10.71
Safety Harness	2.00	7.14
Safety Shoes	10.00	35.71
Aprons	2.00	7.14
Gloves	3.00	10.71
Dust/Gas Respirators	1.00	3.57

Table 8 shows the construction site that uses control measures for fall accidents. It is a sad reality that even with the campaign for massive awareness by informing the construction industry about the consequences of not providing safety measures to the detriment of its workers, construction managers are still hesitant to apply the required measures necessary for the safe implementation of the project. One of the reasons that often mentioned is that these safety measures often add to the indirect cost of the project thereby reducing the possible profit of the project.

Table 8. Frequency and percentage of control measures for fall accidents in the construction site

Control Measures for fall accidents	Frequency	Percentage
Guardrail	3.00	10.71
Warning Barrier	2.00	7.14
Handrail	2.00	7.14
Ladder Cage	2.00	7.14
Anchorage Point	0.00	0.00
Lifeline	2.00	7.14
Fall Arrestors	3.00	10.71
Lanyard	2.00	7.14
Shock Absorber	0.00	0.00
Safety Net	2.00	7.14
Safety Mesh	1.00	3.57

In many cases, such mind-setting of contractors and project managers often lead to maximized profits as long as there are no fatal accidents that may happen to the project.

Most of the construction companies at the site did not provide fire prevention and control measures in the project site. About 70 percent have not made an effort of equipping the site with fire prevention and control items (see Table 9). The absence of fire prevention and control gadgets may be due to the reason that it is unusual for construction projects to get into fire accidents. Somehow, contractors are playing with the idea that fire accidents never happen in their kind of project, that providing fire extinguishers, fire alarm system, etc. are additional cost that may be avoided to optimize profitability of the project.

Table 9. Frequency and percentage of fire prevention and control measures in the project site

Fire Prevention and Control	Frequency	Percentage
Fire extinguishers	5.00	17.86
Fire alarms	1.00	3.57
Storage of flammable liquids	2.00	7.14
None	20.00	71.43

4. Conclusions and Recommendations

The survey has provided this study with enough data to confirm the conditions regarding the safety practices of construction workers at the workplace. The following conclusions are derived:

1. *Safety Trainings and Seminar*. The survey findings showed that the majority of the construction workers in Cagayan de Oro City has not attended trainings and seminar regarding health and safety practices. There is a great need to persuade contractors and employers to educate their workforce on the risks of their workers not being able to understand the dangers of their workplace.

2. *Skills Certificate of Heavy Equipment Operators*. The survey provided a good evidence that construction employers are keen in

making sure that equipment operators were hired because they have the skills to perform their job as proven also from the TESDA certification they possessed.

3. *Penalties for Violating Safety Practices*. The contractors have a policy for penalizing safety violations. However, the violations usually are being imposed when accidents had already happened.

4. *Common Injuries*. The survey identified four common injuries that usually happened in the worksite. These were wounds (due to accidental cuts from sharp tools, etc.), abrasion, bruising, and punctured by nails due to non-wearing of proper shoes at the worksite. It was noted that most of these injuries could have been avoided by proper wearing of the personal protective gears should these gears have been strictly required from the workers.

5. *Daily Safety Practices at the Worksite*. Among the daily safety practices that has been observed by the construction workers at the site are: 1. Toolbox meeting; and checking of PPEs of workers. However, only the well-established construction companies do this practice while medium and small scale contractors did not consider these practices as necessary. The physical exercises for workers were not an acceptable practice because the management and workers agree that the tasks that they do are more than enough for physical exercise of the body.

6. *Risk Management of Hazards in the Construction Area*. The survey identified boundary fencing or perimeter fence is the most commonly adopted measures to minimize the risk in the construction area. However, finding also suggested that this measure became common because perimeter fence was usually a pay item of the project, thereby contractors were more than willing to perform it because of the corresponding return for this work item.

7. *Use of Personal Protective Equipment (PPEs)*. Construction at the worksite were not strictly required to wear their hard hats, except for the established contractors. This survey concluded that PPEs are not yet well introduced at the work sites because contractors have been lenient in requiring their workers to use protective gears in the

workplace. This leniency by construction managers have been the cause of injuries and accidents of workers in the worksites.

8. *Control Measures for Fall Accidents*. This survey concludes that control measure for fall protection has not been properly implemented at the worksites. Only few contractors showed interests in addressing safety precautionary measures by providing guard rails, hand rails, ladder cage, lifelines, safety nets, and others.

9. *Fire Prevention and Control*. This survey confirmed that contractors in Cagayan de Oro City did not consider equipping their workplace with fire prevention measures and devices. There is a need to educate contractors, construction managers and professionals on the importance of fire hazards in the workplace.

As a summary, the researchers concluded that the implementation of safety, standard in the construction projects in Cagayan de Oro City needs more improvements and a more stringent regulation of safety laws to push the construction industry/firms to follow safety and implement safety standards in the site before starting the execution of the project.

The results of this study have shown that contractors needed work on educating their workers in the standard safety practices. It is necessary that the government agencies involved in construction health and safety laws must enforce a more stringent regulation to push the construction industry to follow or implement safety standard or the Department Order No. 13 Series of 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry before starting their projects.

The following intervention is recommended in order to promote safety standard practices on the site:

1. It is recommended that all construction workers shall be required to undertake a seminar on health and safety in the construction workplace. This seminar shall be a requirement for hiring by the contractors/employers.

2. At the university level, a series of seminars shall be prepared in consultation with the safety practitioners to be delivered to the construction workers. This intervention will definitely improve the safety practices in the construction industry of the country.

6. Acknowledgement

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