



Evaluation on the implementation of safety practice by contractors as viewed by safety oriented and non-safety oriented personnel in Cebu City

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ABSTRACT

The construction industry has expanded in scope and coverage by additional rules and regulations established for the improvement and safety of the industrial community, where workers and contractors are the stakeholders. However, it is plagued with numerous occupational accidents. The researchers want to compare the perception of both safety-oriented and non-safety-oriented personnel on implementing safety policies. The research aimed to evaluate the existing practice promoting safety in the workplace and to know how far informed the safety-oriented and non-safety-oriented personnel in the construction industry about safety programs implemented by contractors and how protected the places of work are for the low-income earner.

Convenience sampling was used to select the respondents of the study. There were 162 safety-oriented and non-safety-oriented personnel who participated in the study. The quantitative method was used to know the difference between the perception of the safety practices in the construction firm based on the assessment of the safety-oriented and non-safety-oriented personnel. A two-sample case t-test was used to know if there was a significant difference between the perception of the two categories of respondents. Face-to-face key informant interviews were conducted to collect information from the research respondents to know their perception of the implementation of safety practices by contractors on the construction sites. The perceptions of the safety-oriented and non-safety-oriented personnel on construction safety practices slightly deviate from each other- the safety-oriented personnel have a higher rating than the non-safety-oriented personnel. It is deduced that the non-safety-oriented personnel were oblivious to the safety practices implemented.

KEYWORDS: *Construction, Construction Industry, Implementation of safety practice, Non-Safety-Oriented Personnel, Safety-Oriented Personnel*

1 INTRODUCTION

The construction industry is considered one of the most dangerous areas where accidents and injuries occur because of the unique nature and complexity of construction projects (Jokkaw et al., 2016). There are many risks of injury and incidents in the workplace induced by all four dimensions of the work process in all construction works, whether they are industrial or civil works activities: mechanical risks (falls from height, tripping, slipping, land subsidence, burial, hitting by materials), electrical risks (electrocutions and scorches), thermal risks, and physical risks (noise, work in confined spaces) (Buica et al., 2017). These barriers put the construction industry in an infamous position as the industrial sector accounted for more occupational accidents than any other (Saeed, 2017).

At least 108,000 workers are killed annually, representing about 30 percent of all occupational fatal injuries (International Labor Organization, 2015). In the Philippines, construction workers are much more prone to risk and hazards than most of the primary industry groups in the country (Tala et al., 2021). Of the workforce, 8.8% is from the construction industry, equivalent to 3.5 million workers out of 40.3 million employed Filipinos (Philippine Statistics Authority, 2018). Additionally, according to PSA (2018), there were a total of 2,115 documented occurrences of occupational accidents in the construction industry. Furthermore, half (53.7% or 384) of the 715 occupational injuries with workdays lost in the construction industry were caused by superficial injuries and open wounds. This was followed by fractures (17.3%), foreign bodies in the eye (15.5%), and dislocations, sprains, and strains (5.5%).

Millions of construction workers are subjected to these accidents and occupational hazards daily. Hence, construction safety management should be heightened. According to Occupational Safety and Health Administration (2017), the management should protect every worker from the dangers of injury, sickness, or death by providing safe and healthy working conditions.

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Executing these safety protocols and procedures on-site will ensure the safety of the construction workers (Tala et al., 2021)

Workers are aware of using construction safety equipment but do not adhere to and obey it since it causes workplace discomfort, which soon develops into a terrible working habit (Toyado, 2021). Also, dangerous acts and chaotic and dirty working areas induced accidents in construction areas (Treceñe, 2019).

The Department of Labor and Employment Department Order 13, Series of 1998, enumerated the construction industry's guidelines governing occupational safety and health. The policies highlight the provision of personal protective equipment (PPE). The establishment of a construction safety and health organization, emergency occupational health personnel and facilities, requirements of construction safety signs, the security of heavy construction equipment, construction and health committee, information on safety and health, construction safety and health education, safety, and healthy reports, improve construction, safety, and health facilities, and among other sections (DOLE, n.d.).

Construction safety management is the most critical area in construction work, ensuring the workers' sound health and safety (Benny & Jaishree, 2017). Proper implementation of safety management would make an impact as it reduces the number of fatal accidents and occupational diseases (Manu et al., 2018; Yui et al., 2019). The safety measures that highly contribute to safety management implementation are safety policy, safety training, safety communication, prevention planning, safety control, safety incentives, safety commitment, subcontractor involvement, safety accountability, and safety performance (Kim et al., 2019). Supervisors and safety managers must increase hazard management effectiveness and ensure that recognized danger information is effectively disseminated to workers (Guo et al., 2016).

Additionally, the main objective of this study is to evaluate the existing practice promoting safety in the workplace. To know how knowledgeable, the safety-oriented and non-safety-oriented personnel in the construction industry are about the safety programs implemented by contractors and how protected the places of work are for low-income earners. This research will speculate how a city could make and be a spot for a suitable business investment venue, spurred by its safe and healthy environment.

2 MATERIALS AND METHODS

Research Design

The quantitative method was used to know the difference between the perception of the safety practices in the construction firm based on the assessment of the

safety-oriented and non-safety-oriented personnel. The gathered data help the researchers to compare the perception of the safety-oriented and non-safety-oriented personnel regarding safety practices in the construction industry. A two-sample case t-test was used to know if there was a significant difference between the perception of the two categories of respondents. Face-to-face key informant interviews was conducted to collect information from the research respondents to know their perception of the implementation of safety practices by contractors on the construction sites. Lastly, the researchers benchmarked the established standard like the Occupational Safety and Health Standards (OSHS). The measure become the basis for assessing the current situation in the construction sites. These standards were also be used in designing the questionnaire.

Research Environment

The study was conducted in the construction areas and firms in Cebu City, Philippines. Cebu City was chosen to be the center of the study because infrastructures, buildings, and establishments such as hotels, restaurants, malls, movie houses, schools, churches, sub-divisions, and chains of department stores are rapidly rising. Pardo to Mabolo constitutes the central district of Cebu City. It is in these areas that massive construction works are always seen. This district is the area of concern in this research study. However, the researchers targeted small to medium-sized construction firms. These firms are preferred because construction accidents occur at a high frequency.

Research Respondents

The respondents of the study were the members of United Architects of the Philippines (UAP), Philippines Institute of Civil Engineers (PICE), Site foreman, and some members of the Cebu Contractors Association (CCA). The latter have construction firms in Cebu City. As to some members of CCA, Table 2 shows the 60 contractors categorized as AAA, AA, A, B, C, and D. Then non-safety oriented personnel are the laborers (plumbers, scaffolders, painters, electricians, mason, carpenters, and helper). The respondents were all involved in the construction industry, and they had a significant concern for safety policies and implementation. Table 1 shows the number of respondents.

Research Instrument

The first part of the questionnaire was designed to know the perception of the respondents on health and safety-related practices in construction sites. The first part of the questionnaire was created for the quantitative. The nature of the study is divided into six segments, (1) policy manual, (2) project identification, (3) organizational structure, (4) enhancement promotional program, (5) measure and control program, and (6) safe wire net and assessment program. The rating scale is provided. A score of five (5) means that the policy implementation was from 76% to 100% of the cases and, therefore, very high in frequency.

Table 1. Respondents of the study N=162

Respondents		Number
1. Safety-oriented personnel		
	Architects	42
	Engineers	38
	Foreman	7
	Contractor	60
	Sub-total	147
2. Non-Safety Oriented Personnel		
	Laborers	
	Plumbers	3
	Scaffolders	1
	Painter	2
	Electricians	1
	Mason	3
	Carpenter	2
	Helper	3
	Sub-total	15
Total		162

A score of four (4) means that the policy implementation was from 51% to cases and, therefore, high in frequency. A score of three (3) means that the policy implementation was from 26% to 50% of the cases and, therefore, low in frequency. A score of two (2) means that the policy implementation was from 1% to 25% of the cases and is, therefore, very low in frequency. A score of one (1) means the policy was not implemented. The second part of the questionnaire was an open-ended question for both safety-oriented and non-safety-oriented personnel. It targeted their knowledge of safety programs implemented by the construction industry, government actions on construction safety management, and suggestions on improving construction safety practices.

Research Procedure

1. Gathering and reviewing existing data and reports – this was done before determining additional information that needed to be collected from the key informants. Perform community assessment – this enabled the researchers to prepare and formulate primary questions that needed to be answered and determined the data type required.
2. Determining the target population and

Table 2. Contractor Respondents N=60

Contractors	Classification
AAA	8
AA	2
A	8
B	9
C	8
D	25
Total	60

brainstorming possible key informants – this included identifying the safety-oriented and non-safety-oriented personnel involved in the construction industry.

3. Choosing key informants
4. Conducting face-to-face interviews – since this is time intensive, scheduling for each interview was performed. The designated vital informant interviewer sets a convenient time and place for the discussion. During the interview, the interviewer will initiated an outlined script and a list of open-ended questions relevant to the topic. The critical informant is allowed to discuss their answers freely.
5. Documenting the interview – Two methods will were used to document the discussion – note-taking and audio- recording.
6. Compiling and organizing critical informant interview data – this included transcribing all noted and recording all answers from the key informant. This qualitative data were organized into major categories according to the questions.

Data Analysis

The result will provide direction to reject or accept which hypothesis. The findings of this survey should answer or meet the objectives of this paper. The raw surveys could be mapped to formulate concrete results that will meet the objectives of this paper. The conclusion can be drawn after.

Ethical Considerations

The study was conducted by the principles of the Helsinki Declaration and principles set forth by the Philippine Health Regulation Ethical Board (PHREB), the Republic Act 10352 (Philippine National Health System Research Act of 2013), and CHED Memorandum Order no. 34 of 2007 has required the review of research endeavors involving human subjects. Informed consent was obtained from the respondents.

The researchers compiled the research review application by filling out ethics review forms. The researchers submitted a research proposal, similarity index certificate, technical panel endorsement, informed consent forms, and updated curriculum vitae of the authors. The researchers also filled out a risk assessment application, and informed consent evaluation form.

3 RESULTS AND DISCUSSION

There is a contrasting perception of both safety-oriented and non-safety-oriented personnel on implementing policy manuals. The safety manual is developed to govern safe and healthy working conditions, follow operating practices and manage all employees' moral and legal responsibilities. Additionally, language barriers in the communication of safety policies must be eliminated. The management should create a manual that is comprehensive for the workers. This is a significant factor to consider because construction workers in the Philippines do not have enough education to comprehend technical terms. The management must have comprehensive materials sensitive to the workers' language (Al-Bayati et al., 2017). The project implementation was identified as well-implemented by both personnel. This means that the project was clearly described to the workers, the working schedule was relayed, and the assigned contractors and workers were introduced. Toolbox meetings were executed regularly, including job descriptions, work schedules, staffing, etc., which were essential to properly implement safety practices (Gou et al., 2016).

Both personnel agreed that the organizational structure was adequately presented to the workers. This signifies that the management comprehensively relayed the corporate network but not their functions and responsibilities as safety implementers. The non-safety-oriented personnel rated "describing the individual safety and responsibility and describing members and

functions of the safety committee" as the least implemented. The contractors must thoroughly discuss the construction workers' safety protocols before deployment. The supervisors' role is to create a supportive environment in which meetings and ongoing safety instructions are given to workers (Gou et al., 2016).

The respondents' perceptions of the enhancement and promotional safety contradicted where safety-oriented personnel said it was adequately implemented, but the non-safety-oriented personnel said otherwise. This means that the safety-oriented personnel did their part in enhancing and promoting safe practices. Still, the non-safety-oriented personnel might argue because of the high accident rate at the construction site. The least implemented functions are the outline of health and safety training plans and risk control measures according to the non-safety-oriented personnel. These two factors, inadequate safety training and lack of safety design, are the common factors that escalate high accident rates (Saeed, 2017). The respondents agree on implementing the control and measure on the construction sites. This implies that the construction firms adequately describe how to report accidents, investigate and record accidents, describe safety procedures, indicate legal ordinances and regulations, and detail emergency plans and teams. Health and safety awareness is positively related to compliance with OHS regulations by workers regarding their safety and psychological climate (Eyiah et al., 2019). Adapting the health and safety standards is very effective in controlling and measuring safety performances, but implementing these standards is arduous. This might be why it is rated as least implemented in the previous statements.

Both respondents agree that the provision of safety equipment could be seen on the construction site. The condition of protective equipment, availability of PPE, and manuals on how to properly use the equipment are critical in securing the safety of the workers (Gunduz & Ahsan, 2018). The problem is that workers tend not to follow this safety protocol (Toyado, 2021).

The result of the t-test is closely related to the findings of (Gunduz & Ahsan, 2018; Usukhbayar & Choi, 2020) that there is a difference between the perception of the safety-oriented and non-safety-oriented personnel in the construction industry. It is observed in the mean values that there is a gap between the rating of the safety-oriented and non-safety-oriented personnel. The t-test result ($t = 7.07$) lies beyond the critical values (1.667), which implies that the null hypothesis will be rejected. This means that the perception of safety-oriented and non-safety-oriented personnel differ from each other. However, almost all areas are well-appreciated by both parties, but some areas need to be focused on by the safety-oriented personnel. These areas are viewed by the non-safety-oriented personnel as least implemented like the description of individual safety responsibilities of the officers, description of the members and function of the

Table 3. Availability and Implementation of Safety Practices

Safety Practices	Safety-Oriented N=147		Non-Safety Oriented N=15	
	WM	DE	WM	DE
Implementation of Policy Manual				
1. Maintain safe health working condition	2.91	I	4.18	WI
2. Follow operating practices	2.91	I	4.28	WI
3. Restricting moral and legal responsibility for all employees under their control	2.9	I	3.91	WI
Subtotal	2.9	I	4.12	WI
Project Identification				
4. Describe the project before its implementation	3.68	WI	3.95	WI
5. Set forth key dates of project start and end	3.79	WI	3.66	
6. Identify sub-contractor and workers before the project started	2.81	I	3.6	WI
Subtotal	3.42	WI	3.73	WI
Organizational Structure				
7. Outline the structure of the organization	4.21	VWI	3.93	WI
8. It describes the individual safety responsibilities	2.55	LI	3.78	WI
9. Describe the members and functions of the safety committee	2.49	LI	3.8	WI
10. Emphasize the frequency of meeting	4.12	WI	3.85	WI
Subtotal	3.34	I	3.84	WI
Enhancement and Promotional Safety				
11. Outline of health and safety training plan	2.38	LI	3.48	WI
12. Promote other activities for safety	2.75	I	3.55	WI
13. Indicate goal and frequency of meeting	3.41	WI	3.58	WI
14. Describe risk and assessment and evaluation	3.32	I	3.6	WI
15. Implement risk control measure	2.53	LI	3.63	WI
Subtotal	2.87	I	3.56	WI
Measure and Control				
16. Describe the procedure to report accidents and dangerous conditions	3.31	I	3.7	WI
17. Outline procedures for investigation and compiling statistics	2.83	I	3.73	WI
18. Describe safety procedure for each site operation	3.29	I	3.88	WI
19. Indicate relevant legal ordinances and regulations	3.13	I	4.18	WI
20. Detail emergency plan and emergency team	2.78	I	3.86	WI
21. Describe the assessment and control of hazard	2.76	I	3.75	WI
Sub-total	3.02	I	3.85	WI
Safety Wire –net				
22. List of all commonly use PPE	2.91	I	3.88	WI
23. Indicate minimum stock quantities of PPE	3.18	I	3.85	WI
24. Requirements and procedures For its use	3.30	I	3.93	WI
25. Outline of health and responsibilities	3.14	I	3.75	WI
26. Identify obligation of sub-contractors	3.30	I	3.00	WI
27. Describe the procedure for selecting and controlling sub-contractor	3.27	I	3.91	WI
28. Internal audit inspection carried at least once a year	2.29	LI	3.00	I
Subtotal	3.05	I	3.75	WI
General Average	3.08		3.78	WI

safety teams, the outline of health and safety training plan, implementation of risk control measures, and annual internal audit of the PPE's.

Knowledge on Safety Programs Implemented by the Construction Industry

The safety-oriented personnel T2 said, "I am aware of the Occupational Safety and Health (OSH) programs." Moreover, non-safety-oriented personnel N1 and N3 confessed, "I am informed of any safety programs because of the signages placed at the entrances of the construction sites." However, N1 said, "I was not aware of any safety programs implemented by contractors in the construction industry." The safety-oriented personnel were informed and knowledgeable of the safety programs implemented because some are practitioners, unlike the non-safety-oriented personnel who are inexperienced in the field. Safety-oriented personnel should know the safety protocols because they are part of their discipline, and the clients require them for bidding (Juanzon and Muhi, 2017).

Government actions on Construction Safety Management

The safety-oriented personnel T1 and T2 said, "Construction safety program as a requirement for construction projects" as the coordinating government agencies. T2 continued, "Duration of site inspection was rather not regular as conducted by Office of the Building Official and Environment, Health and Safety (EHS). Urbanized cities are deputized by the Department of Labor and Employment (DOLE) for their own EHS department". In addition, T3 further explained, "The government, particularly the Department of Labor and Employment (DOLE) and Department of Public Works and Highways (DPWH) signed a Memorandum of Agreement aimed at improving the process of approaching construction safety & health programs for all construction operations, ensuring the safety & health of construction workers." On the other hand, the non-safety-oriented personnel, N1 and N2, disclosed, "I do not have any idea as to actions of government agencies in safety protection on the construction industries." At the same time, N3 said, "Making visits and inquiries will promote the protection of our workers. LGUs are authorized to inspect the site in public safety". Intervention from the government should improve the safety management of the construction industry. Indeed, DOLE Department Order 13 established guidelines governing occupational safety and health in the construction industry, stating that every construction project must have a Construction Safety and Health Program (DOLE, n.d.).

Suggestions on Improving the Construction Safety Practices

Regular Inspection

The safety-oriented personnel, T1 and T3, suggested, "There should be a regular inspection at construction sites." T2 continued, "There should be personnel from DOLE to conduct regular inspections. Government agencies are preoccupied with so many industries aside from construction." The stakeholders should take prevention measures like the inspection to ensure the safety of the workers at the construction site because this affects the productivity and image of the firms. Management's commitment and involvement are crucial in achieving safe workplace performance (Zaira et al., 2017).

Onsite Seminars and Lectures

T3, N1, and N3 suggested, "There should be orientation seminars on safety practices to keep them abreast of the latest provisions about workers' rights and safety." Also, N2 suggested that "There should be a wide dissemination of safety practices" Continuous education to construction stakeholders significantly improves their safety management performance. An effective communication system should be set up to broadcast and explain the safety rules to workers, including the newly-joined workers and inexperienced in the working environment (Yui et al., 2019).

4 CONCLUSION AND RECOMMENDATION

The study had unraveled that the perceptions of the safety and non-safety-oriented personnel deviate from each other. It is justifiable that the safety-oriented personnel know the safety protocols of the construction industry. However, the non-safety-oriented personnel have heard and witnessed the improper implementation of safety protocols on the construction sites. The construction industry should abide by the existing safety protocols and promote safety and continuous enhancement of safety measures to avoid occupational accidents. The safety measures should be equivalent to the complexity of the construction projects to have a safe and healthy environment.

The construction industry should improve its safety protocols to control the fatality rate. Thus, the site supervisor should have regular inspections with the regulating agencies to assess the possible cause of hazards and training to enhance their capability to implement safety measures and update safety standards. Regular toolbox meetings to inform the workers to follow the safety protocols regularly. Lastly, the construction industry should inform the non-safety-oriented personnel that there is excellent safety management in the working sites through the outstanding positive results of the industry.

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