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Implementation Of Safety Management Of Selected Construction Companies In Manila

Reynaldo C. Carolino*
Master of Science in Construction Management, Polytechnic University of the Philipines.

ABSTRACT

To reduce the waste of material and danger of accident and deaths within sector of construction, safety management system was developed in the 1980s. With the correct SMS deployment, construction companies can reduce safety-related difficulties This study assessed the current status of construction safety management with the goal of determining the level of implementation of selected construction companies with category AAA in Manila, Philippines. Additionally, a survey was done to determine the SMS implementation level in terms of lack of control, basic cause, immediate cause, incident, and accident. The researcher used the quantitative method of research with the survey questionnaire as the main tool in gathering data. Architects, engineers, safety officer and skilled workers were the respondents of the study. The gathered data were statistically treated with the used of frequency, percentages, and weighted mean. The results of this study are helpful to the industry as well because they can improve the understanding of SMS among industry professionals and aid in better SMS deployment at work.

Keywords: Manilla, Safety Management, construction.

Introduction

Background

The construction sector comes under the greatest hazardous industrial service in the country, according to the Philippine Statistics Authority. Workers being struck by moving objects, being attacked by a moving vehicle, and falling from heights continue to be the three most prevalent causes of fatal injuries across all industries, accounting for over fif y percent of deaths in 2020–21.

Lack of safety training, inexperienced scaffold installers, low-quality safety walks, inappropriate tool use, improper maintenance of power equipment, and poor housekeeping are a few factors affecting the level of safety management implementation among Manila's construction companies. For these reasons, proper implementation of safety management must continue to be a top priority even while the modern workplace has created new health challenges for both employees and those who have a responsibility to them. By doing the proper implementation of safety management, incidents or accidents involving employees will be avoided, outstanding performance will be rewarded with big bonuses and incentives for the personnel and management, and the owners will reap significant financial rewards. Learning and implementing the construction safety not only reduces risks and accidents but to save time during construction and to reduce unexpected, accidental expenses. Consequently, the goal of study is to view how

Reynaldo C. Carolino
Master of Science in Construction Management, Polytechnic University of the Philipines.
reynaldocarolino1728@gmail.com

well safety management is implemented and used to improve construction project safety in Manila. The scope of this investigation was limited to particular building construction in Manila and are classified as General Building one and as category AAA. Only architects, engineers, safety officers and skilled workers were included as research respondents.

Theoretical Framework

This study was based on Herbert. The Domino hypothesis of William Heinrich, whom Bird and Loftus revised. These researchers developed an instrument to evaluate worker safety on construction sites, focusing on factors such as insufficien management, fundamental reasons, immediate causes, symptoms, and incidence (the event that could harm either people or property) and accident (properties, people, processes). (Rad, K. G., 2013)

The first frame provides the study's input, which contains respondent profiles such as age, gender, position, and decades of experience. It also contains the respondents' categorization, namely owner, manager, and worker, in the input frame. The second frame describes the study's process, which includes assessing the execution of safety management in chosen building firms on the basis of lack of oversight (management), basic causes, right away causes, occurrence and error through data collection using a survey, data collection, statistical treatment, analysis, and interpretation of quantitative data.

3rd frame showed study's output which includes the assessed level of safety management of selected construction companies and the action plan and/or the recommendations. The path that runs between input to output indicates feedback, which illustrates the flow s continuity and the elements' connection.

Statement of the Problem

The purpose of this research is to evaluate the application of safety management in selected construction firms in Manila. This study specifically seeks to respond to the following questions:

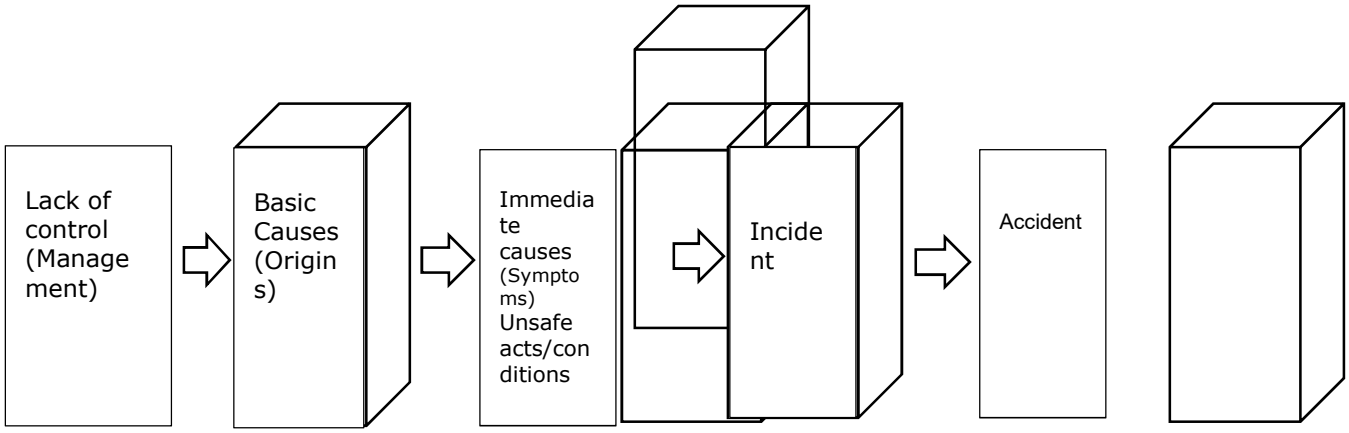

Figure 1. Updated Domino Theory

1. What is the response profile in terms of the following:

1.1 Age; 1.3 Company Position; and
1.2 Sex; 1.4 Years of Experience?

2. How do respondents rate the safety management tools of chosen construction businesses in terms of:

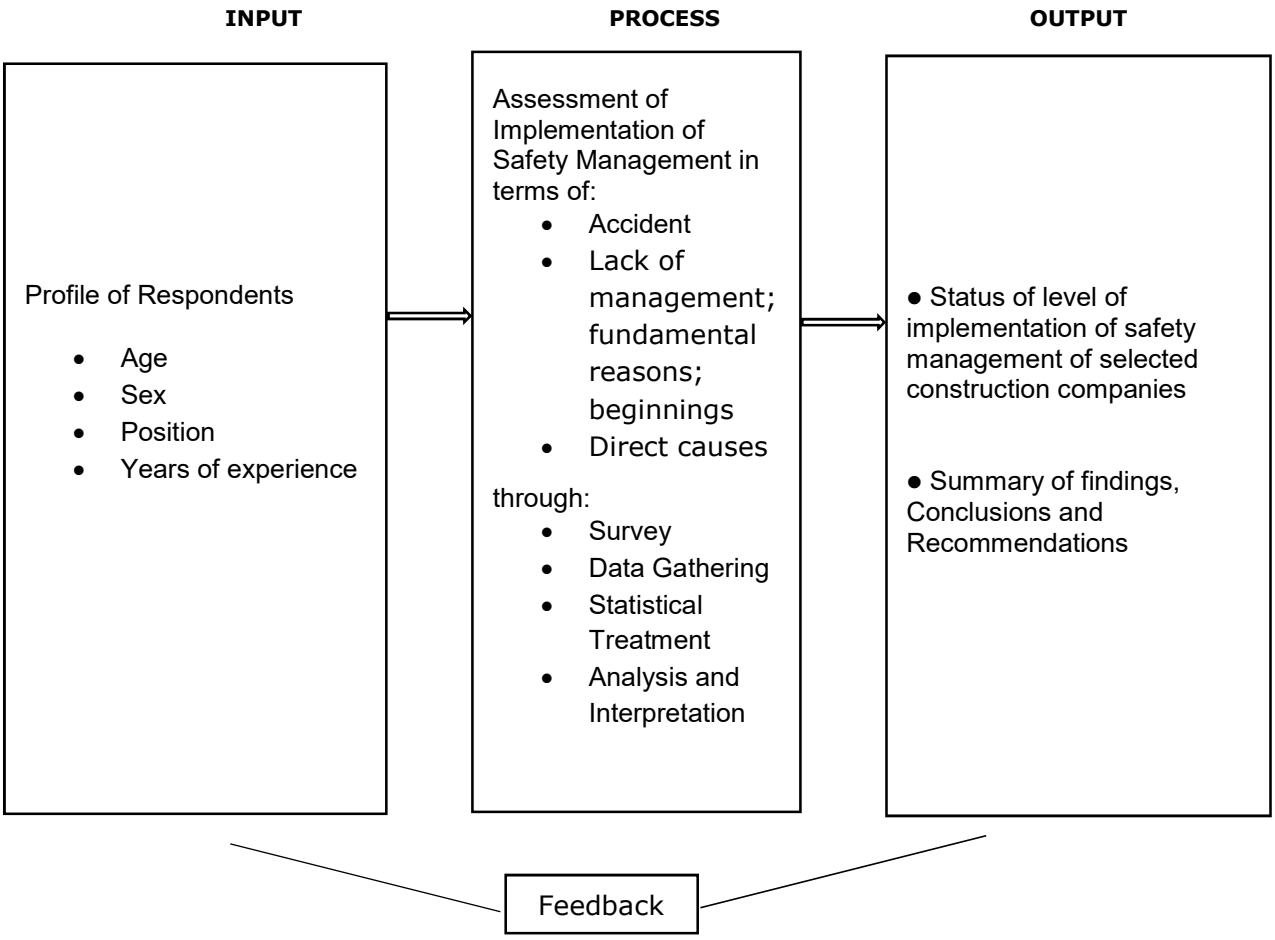

Figure 2. Conceptual Model of the Study

2.1 Management failure; 2.2 Basic reasons (origins); 2.3 Immediate causes; 2.4 Incident; and 2.5 Accident?

1. Is there a substantial difference in respondents' opinions of the application of safety management in construction enterprises when grouped by profile

2. What is the proposal for improving the selected construction businesses' safety management?

Hypothesis

The hypotheses in null form were tested in this study.

Ho1: There is no significant difference on the assessments of selected construction company respondents when grouped according to profile

Scope and Limitation of the Study

This study was limited to evaluating the safety management implementation of chosen construction companies in Manila in terms of lack of oversight (management), immediate consequences, accidental event, (the event that might lead to damage either to people or properties), and error or loss. In addition, the study was limited to construction companies with the classification of General Building -1 (Building or Industrial Plant) and with category AAA.

Also, the study was limited to the ninety-eight percent controllable or preventable accidents, as mentioned by H.W. Heinrich.

The respondents of this study were limited to architects, engineers, safety officer and skilled workers.

Significance of the Study

Research has the aim to provide valuable information on how the Implementation of Safety Management can affect the construction companies and its relevance in the field of engineering.

Also, this research study may contribute for construction companies implementing safety management because it may encourage them to enhance their safety management, particularly at the beginning of the project with proper planning, organizing, monitoring, and leading on safety up until the project's completion in order to lower and/or eliminate the injuries and accidents at construction sites.

In addition, it will be a big contribution to the company and to the implementers of safety management in the construction site such as the architects, engineers, safety officer especially the workers who will operate in a safe environment, safe act and safe conditions if they are given greater knowledge, information, and awareness about the importance of intervention of safety management into the building process at the onset of the project which is the phase before the construction and heavily implemented within the phase of construction stage and continuously monitored and implemented up to the post-construction phase.

By doing the proper implementation of safety management, incidents or accidents involving employees will be avoided, outstanding performance will be rewarded with big bonuses and incentives for the personnel and management, and the owners will reap significant financial rewards.

The additional information on the sustainability of safety management implementation, and comprehensive advance planning on safety management on the pre-construction, construction phase and post-construction phase may be provided by the other researchers of the same study.

Definition of Terms

The following concepts are defined theoretically and/or operationally in the study to guarantee clarity and comprehension.

Accident - It is an unanticipated, unpleasant incident or occurrence that causes material or property loss, bodily harm, or wrongful death.

Behavior-Based Safety (BBS) - makes use of safety observations to inform supervisors and employees on the general state of workplace safety (Christino, 2020)

Construction Company - a specific form of company, firm, enterprise, or group founded to handle different construction projects.

Hazard – a potential cause or event that could result in harm to people or property, poor health, surrounding hazard.

Herbert William Heinrich - an investigation of insurance claims was conducted by safety innovator of America who served as the Assistant Superintendent of Travelers Insurance Company's Engineering and Inspection Division. Heinrich discovered 98 percent

Accidents that occur at the site of work have the potential of being prevented, and only 2% are not preventable after studying a great number of accidental event's reports filled out by supervisors who typically blamed employees for accident deprived of conducting in-depth surveys into the fundamental reason.

Of the 98% of accidents that could have been avoided, 88% were caused by hazardous or unhealthy activities or "man failure," and 10% were brought on by unsafe or unhealthy situations. Research showed justification for concentrating interventions on altering the attitudes and behaviors of management and employees toward safety and health.

HSE (Health and Safety Environment) - is a business or organization's attempt to reduce unintentional dangers at work. Interventions to alter the behaviors and perspectives of employees and management with regard to health and safety

HSE Management It ensures that risks to the health, safety, environment, and security of employees are reduced, and streamlines HSE compliance, including training, accident response, emergency preparations, etc.

Incidence Rate (IR) – refers to instances of workplace accidents with workdays missed per 1,000 workers.

Near-Miss Accident Reporting - The reporting of circumstances that could have resulted in an accident but didn't is what this is. To avoid a recurrence of the incident, lessons are drawn from the reports' information.

Occupational accident - an unforeseeable incident, such as violent crimes committed at work, that results in physical harm, illness, or death of one or more employees. A worker may do business for his or her employer while commuting, driving, or in traffic as well as away from the employee's usual workplace or company grounds, such in another facility.

An occupational injury is brought on by a job-related incident or a single, instantaneous exposure at work (workplace accident). Every incident of occupational injury is the serious case and therefore, it is necessary to count it individually when several persons are wounded in a single accident. Each time a single worker is hurt in an industrial accident more than once within the reference period,

OHS is a multidisciplinary subject that covers all aspects of occupational health and safety, with a focus on hazard avoidance.

In the United States, OSHA is in responsibility of protecting worker safety and health. Congress formed OSHA in 1971 as a follow-up to the Occupational Safety and Health Act of 1970 to guarantee that working conditions are safe and healthy for employees. OSHA does this through the enforcement of workplace laws and regulations, as well as outreach, training, information, and support.

Process Safety - is a methodical framework for controlling the integrity of processes and operating systems that handle hazardous materials by using sound design, engineering, and operational principles. It is concerned with the prevention and control of situations in which dangerous substances or energy might be discharged. Such incidents may cause hazardous reactions, fires, or explosions, resulting in significant casualties, property damage, lost productivity, or environmental consequences. (Thanaraj, M. S., & Priya, M., 2019)

Risk – a combination of the risk that a dangerous event will occur during a specific time period or under specific conditions, as well as the severity of the harm that the event may do to the environment, property, or any combination of these.

Risk Breakdown Structure (RBS) - A risk breakdown structure, or RBS, is a hierarchy

diagram that categorizes risks associated with a project into higher-level and lower-level categories.

the management duties involved in carrying

out an industrial enterprise that are related to the safety of its employees, such as planning, formulating, organizing, and putting into effect a safety policy; monitoring, auditing, or analyzing such performance. (From the Hong Kong Labor Department's "Code of Practice on Safety Management")

Safety Performance - is referred to as the standard of work connected to safety, and an upgrade in organizational structure can reinforce its robustness or resistance and reduce the probability of accidents.

Unsafe/unhealthy Act - This is described through ANSI as "any kind of act of humanity that violates a generally recognized safe work process or standard operating procedure." They usually happen when the employee embraced not so good attitude, physical limitations, or a lack of knowledge or ability.

Unsafe/unhealthy Condition - According to ANSI, this is any physical characteristic of a substance, machine, that has the potential to harm people or property, interfere with business operations, or result in other types of losses. These conditions could be protected against or avoided.

Work Breakdown Structure- Within project management, there is technique for implementation of the difficult project with the steps that are more than one. It is a method of splitting and conquering large undertakings in order to execute them faster and more effecti ely.

Literature Review

Via this section, pertinent literature, research, thesis, publications, and journal articles to support the significance of the current study in relation to the implementation of safety management at particular construction fir s is delivered with the aim of assessing the implementation of safety management from the selected construction companies utilizing the variables from the Domino theory. From the literature that has been supplied, this study will support the researcher's assertion that there is a gap in the implementation

of safety management in construction businesses. At the conclusion of this chapter, the

researcher will also provide his grand synthesis.

Safety Management

On a global scale, the construction industry is large and frequently referred to as an economic organization.

The industry is critical to a country's economic progress, but it is now confronted with several problems that impede project goals and continued economic advancement. Edifice formation is the sector of increased risk, that integrates preparation, designing, building, changing, maintaining, repairing, and ultimately destroying of buildings, along with projects involving civil engineering, mechanical and electric engineering, and other similar activities. Construction is a sophisticated sector that is prone to disagreements, interruptions, and cost overruns. The construction sector contains traits that are unique to the construction business. 2017 (Hillebrandt).

There are numerous advantages to high safety ratings in the construction business, many of which are tied to the proper implementation of safety programs. Because there are fewer workplace accidents and illnesses, absenteeism and turnover are lower, and productivity is greater. The aims of implementing safety rules in construction projects, according to Rowlinson, are to limit needless and risky acts, to notify risks and dangers, and to ensure that occurrences are documented and handled effecti ely.

Companies that implement safety initiatives increase their revenues, employee morale, reputation, and the quality of their output, according to Oliveira et al. (Buniya, M. K., Othman, I., Sunindijo, R. Y., Kineber, A. F., Mussi, E., & Ahmad, H., 2021).

According to Peng, R., Zhang, M., & Liu, T., (2021), The number of workers on construction

sites has gradually expanded as a result of China's economy and the building and construction sector's continued expansion. In a variety of industries, China recently established rules for safe production. To fully advance their degree of comprehensive management, construction enterprises must According to Rowlinson, the goals of applying safety standards in construction

projects are to minimize unnecessary and dangerous behaviors, to warn of hazards and dangers, and to guarantee that incidents are documented and addressed appropriately in the construction sector, the increased need for engineers, and the challenging work factors.

However, it is evident from the frequency of accidents in recent years that the enterprise engineering construction's safety management is insuffici t, the required level of safety management for construction enterprises has not yet been reached, and there is not yet a culture of responsibility within the organization. Project safety adoption has an effect on secure society development all over the whole and is linked to social steadiness and the acquisition of benefits for people's lives. High-altitude operations are frequent at construction sites. The building difficu y coefficien is therefore relatively high. A building site's environment is also dynamic and complicated, which poses challenges for people who work there. (Peng, R., Zhang, M., & Liu, T., (2021).

Also, according to Peng, R., Zhang, M., & Liu, T., (2021) Construction sites typically have harsh working conditions, and the project's construction has poor safety performance. Building corporations are compelled to offer workers safety training while they pursue financial rewards. Businesses must make sure that employees within this section attain the competence of finishing process safely, and units must aggressively reinforce their own safety consciousness in order to raise security consciousness of construction personnel.

Peng, R., Zhang, M., & Liu, T., (2021), showed that there is a lack of accountability and poor construction management on the whole. As more construction projects are being done today,

engineering construction management is growing more difficult At the construction site, there are still a lot of undiscovered dangers. Some of the units within the sector are still ignorant of the issue with seeing security monitoring and management of the site, and there is still no safety management in place for engineering construction.

Businesses are functioning without the necessary safety management systems or paying insufficien attention to novel types of possible

safety concerns. which has led to an expansion in the area of risk management. It will be difficul to achieve the goal of zero accidents if the construction unit continues to employ a standard safety management strategy because safety management scope of the construction site will not be appropriately covered. (Peng, R., Zhang, M., & Liu, T., (2021, April)).

The use of numerous modern technology at the accident scene has also affected the potential safety issues that might have occurred there. Without comparable measures to rely on, it is challenging to secure employee safety, which in turn makes it challenging for firms to generate profits. The construction unit must therefore rationally establish safety management approaches in accordance with the actual construction conditions at various phases and diverse construction features in order to ensure the project is implemented safely. (Peng, R., Zhang, M., & Liu, T., (2021).

According to Zhang et al. (2017), the scope of construction safety management is difficult to defi e since there are so many safety risk factors and they cover such a broad range of topics. He claims that several scholars have attempted to differentiate between the pre-construction and construction phases of construction safety management.

The first step was leveraging the expertise of specialists or managers to identify potential hazards, which were then removed using the required preventative measures. In the second stage, he proposed that accidents may be avoided by keeping an eye on the site's machinery, personnel, and general atmosphere. Researchers found that construction safety management should gradually progress throughout overall structure \

time period, leading the detailed management of security, rather than being restricted to just the construction phase as they investigated more operative safety management techniques with improved safety concepts. (Zhang et al., 2017),

According to Tayeh et al. (2020), the 3 phases within the construction project are before the construction, during the construction, and after the construction. He continued by noting that the pre-construction stage is always given priority initially in the management of a building project. Preparation, scheming, and offering are considered the "upstream" activities, whereas construction is seen as the "downstream" activity. Furthermore, he indicates that worker safety and health should be prioritized by both "upstream" and "downstream" requirements.

In addition, Tayeh et al. (2020) present data demonstrating that OHS-related problems with building projects can happen at any time, not only during construction. If more effort had been made during the project's pre-construction phase, the majority of H&S issues that emerged during the building phase may have been solved. Since they reduce risks at their source, H&S standards during pre-construction stage recognized as the proficient method for managing OHS. The results of a study, which group the primary reasons of accidents into three categories—poor design decisions, insufficien planning, and human error—support this assertion.

The practical definition of limiting the potential for the elements that were a cause of damage is being addressed by implementing practices that make the aspects more secure. OHS therefore, has a substantial impact on the projects' H&S allied results at the stage which come before the actual construction.

The promotion of OHS is now essential during pre-construction procedures like planning, designing, and tendering. The safety of construction workers must be the first priority for the project manager (owner's representative), planners, and designers.

The planning and designing stages offer the chance to reduce hazards and damages before they happen on the job site. This possibility of risk mitigation declines as the project progresses. Project manager needs to involve the OHS throughout the pre-construction phase if he or she is to be successful.

Basic causes (Origins)

Everyone who is trying to reduce accidents and improve safety performance is concerned about human behavior. A term that is frequently used is "Behavior and accidents are what it is all about.".

Behavioral safety, according to McSween & Moran (2017), is the application of the application of behavioral studies on individuals to workplace safety concerns. It indicates that a security program claiming to be a psychological safety strategy must follow the guidelines established by behavior analytic research for workplace procedures. Behavior-based safety is a promising technological advancement for the sector. It's a fantastic approach to learn about how well a company's safety management system is performing. It uses science to ascertain why people behave in certain ways when it comes to safety. If done effecti ely, it is also an important next step in establishing a proactive safety culture in which loss avoidance is a fundamental value. Though conceptually simple, behavior-based safety is typically difficul to implement and maintain.

According to Christino (2020), behavior-based safety (BBS) is a technique that employs safety observations to advise executives and staff concerning the general security of the workplace. BBS is intended to raise employee awareness of themselves and their coworkers' routine safety procedures. The BBS program seeks to improve employee security for the benefit of the company.

Dakota (2020) defines "behavioral security in the occupational" as the use of human performance research to workplace safety challenges.

It indicates that any safety program that calls itself a "behavioral safety program" must adhere to the standards set by behavior analytic research for workplace practices.

Each person is responsible for their own security. Everyone employed by the organization should receive training on how to conduct themselves professionally, take workplace regulations seriously, recognize potential hazards, and take

precautions to avoid them. They must also notify their supervisor right soon of any mishaps, illnesses, or injuries. Management, on the other hand, is responsible for providing a healthy and secure workplace, providing personal protection equipment, training personnel in safety practices, and identifying hazards. Gonzalez (2018).

Direct causes

According to Rafindadi et al (2022),

The following employees variables were discovered in earlier studies: Individual characteristics, voluntarily engaging in risky activities, rushing to complete task, human error and unsuitable using the controls; improper use of in-operative PPE; failure to wear PPE; insufficien knowledge of potentially hazardous situations; workers' unfamiliarity Workers' inexperience with the working environment; dangerous actions by others;; running machines at prohibited speeds; fixing machine or apparatus while in operation; workers' inexperience with the workplace environment.

Workers' safety mentality; lack of information about safety and job skill; recklessness; failure to keep up with work and safety regulations; and worker error may account for around 33% of construction falls from height. Every year, drug comes under the primary causes or contributing aspects within large number of workplace accidents. Another reason that might lead to accidents on construction sites is a language barrier, since the majority of construction labors are recurrently strangers who do not speak or comprehend the local language.

The following elements have been recognized as falling under this category, according to Rafindadi et al. (2022): dangerous employed events, loud noise, defective tools, equipment, supplies, and personal protective equipment (PPE); inadequate sustenance or protectors; inadequate systems of warning. The complexity or difficu y of the job, which diverts workers' attention when they are height work, may also play a significant role in the cause of falls. Insufficien lighting within the course of night shifts might further influence surrounding vision and ultimately result in falls for a location that is open 24/7. A support system malfunctioning, being struck by an object, or falling through an unprotected or concealed hole are some scenarios that might result in falls. Other risk factors include inadequate scaffolding, a lack of edge protection, hazardous building windows, a lack of edge safety during roof construction, risky renovation work, and improper ladders and hoists. As per Chi et al., the main reasons behind the fatal falls are unsafe holes and a lack of scaffold compliance. Concerns with scaffolds include a lack of a working platform, an inadequate scaffold for the job, and a permanent obstruction for the working platform. The most common reasons for fatal fall accidents. Also, it was demonstrated that working too long on a damaged scaffold or ladder is one of the factors contributing to falls. Moreover, it could occur as a result of working along precarious walkways, closely to structural edges or openings, without guardrails or with the incorrect sort, unsecured stairs, slippery surfaces, or skylights.

Incident

According to the modified Domino theory model, which takes management into account, incidents begin with management's loss of control. Preparation, governing, coordinating, and directing via administration are the aspects that can stop incidents from happening. Vincoli divided the main causes into two groups: people factors and environmental factors. Personnel considerations include things like unrelated personal issues, mental health issues, sickness, a bad attitude, and a lack of knowledge or abilities. issues that are work-related, such as poor workmanship, regular or unusual wear and tear, inferior tools, and poor equipment design or maintenance.

According to the new model, hazardous behaviors and circumstances are signs of underlying problems that resulted from dominoes 1 and 2. Vincoli contends that the management system permits the variables to remain unchecked and improperly controlled, resulting in an event. (Y. Chen and Z. Wang, February 2021)

According to a data from the Ministry of Implementation and Labor, the construction sector was responsible for 26.6 percent and 27.1 percent, of all industrial accidents in South Korea in 2018,

resulting in 27,686 injuries and 570 fatalities.

Many studies of the underlying reasons were done in order to stop fatal accidents within construction sector. Given that majority of

fatal accidents occur during the construction phase, the best way to avoid such catastrophic events is to anticipate their likely occurrence in the pre-construction phase.

The following traits apply to construction accident types. First, based on the project kind, there are different tasks. One significant fatality that occurs during building construction is called "Fall," for instance. Yet, "traffi accident" is important when there are road construction projects. As a result, the project type should be taken into account to lower the numerous fatal incidents in the construction sector. The sort of labor should also be taken into account. For instance, "Fall" and "Slide" are prominent accidents kinds while performing structural work that is typically done at an elevated site, but "Electric shock" is the hazard that needs to be taken into account the most when performing electrical work. Third, it's important to properly segment the accident type. There are many different kinds of tragic incidents, such as those that fall, get hit, or involve traffi

WBS and RBS concepts were used in previous study that included the project, work, and accident types to evaluate fatal incidents in the construction industry. WBS stands for a group of work items in a certain project that accurately defines and characterize the scope of the task. RBS is able to identify hazards in a project and calculate the amount of risk for a unit of work..

The WBS and RBS merger brings a number of advantages (i-WRBS). The risk level related to a certain unit of work can be easily ascertained first. Second, it is possible to identify the riskiest professions. Finally, decision-makers can utilize this strategy to control risks before building begins. The WBS-RBS hierarchy can also facilitate risk management for construction projects.

Just a small number of studies, utilizing real accident data from the construction industry, have coupled WBS with RBS to date.

Accident

Construction-related workplace fatalities decreased. The Health and Safety Executive (HSE) recently released data showing that construction has the greatest percentage of fatal injuries overall. About four times the average for all industries, the construction sector has a higher fatal injury rate (at 1.84 per 100,000). Nonetheless, it is far lower than in forestry, fisher , waste and recycling, and these sectors.

While many staff were in fact furloughed in 2020–21 and so technically off the job, the HSE claimed that coronavirus had made it challenging to calculate injury rates. To begin, divide the total number of fatal injuries by the anticipated workforce size to get the number of fatal injuries per 100,000 workers. The HSE asserted that this measure would be beneficial even though it would overestimate the number of persons who were genuinely employed in 2020–21.

In terms of job status, the HSE discovered that 35% of those killed in construction accidents in 2020/21 were self-employed and that 65% of those deceased were employees.

Workers being struck by moving objects (17), being struck by a moving vehicle (25) and falling from heights (35), which together accounted for more than half of fatalities in 2020/21, continue to be the three most common causes of fatal injuries across all industries. Temporarily, roughly 30% of fatal injuries in 2020/21 will include individuals aged 60 or older, despite the fact that such people account for just about 11% of the total.

Mesothelioma, a cancer brought on by prior asbestos exposure, caused 2,369 deaths in Great Britain in 2019, which was 7% fewer than the 2,540 deaths per year average over the previous seven years.

"Although the modern workplace has brought up new health issues for both workers and those who have a responsibility to them, safety must still come first " said Sarah Albon, chief executive of the HSE. Even though the situation has significantly improved over, we are committed to making workplaces as safe as possible and making sure that employers are held accountable and take their responsibilities seriously. (Construction deaths

fall in 2020/21 - Construction Management)

Even if the modern workplace has created new health challenges for both employees and those who have a responsibility to them, safety must remain a top priority. Although if the situation has substantially improved over time and Great Britain is one of the safest places to work in the world, every fatality at work is heartbreaking. We are committed to enhancing workplace safety and ensuring that employers are held responsible and take their duties seriously.

There are many different reasons why accidents might occur on construction sites. The most common causes of death for construction workers were falls, followed by being struck by an instrument, electrocution, and being imprisoned. 56% of accidents involve falls from heights, 21% involve getting trapped by toppling or collapsing objects, 10% involve being hit by a moving vehicle, 4% involve being hit by a flying or falling object while using a material-lifting machine, 3% involve coming into contact with moving machinery or material that is being machined, and 1% involve being exposed to a hot or dangerous substance. (Thanaraj, M. S., & Priya, M., 2019)

According to the Department of Safety and Health in Malaysia, the Consolidated Table of Construction Accidents for June 2019 indicates 43 accidents and 46 fatalities. The bulk of them involved falling from a height, while there were also substantial injuries from collapse incidents and object collisions. Building companies can use this information, which is based on yearly accidents, to promptly stop the development of safety calamities. This helps uncover solutions to the accident's underlying causes and ensure the safety of every construction worker. This can help address the current problems with managing safety on construction sites and advance the project's successful conclusion.

The level of enterprise safety consciousness is low. The bulk of construction businesses currently have a poor foundation in terms of safety awareness. Additionally, the majority of contemporary engineering construction uses cutting-edge techniques, materials, and other building processes. Yet, because

Consolidated Table of Construction Accidents in June 2019

Serial No.	Reason	Death/Person	No. of Accidents/Time
1	Fall from height	22	22
2	Collapse accident	9	6
3	Other accidents	3	4
4	Object stricke	8	8
5	Mechanical Demage	1	1
6	Lifting injury	2	2
	Total	46	43

Table 1: Consolidated Table of Construction Accidents in June 2019

migrant workers make up the majority of the construction workforce, businesses are unable to promptly offer safety training and instruction. In general, the approval process for new buildings is drawn out. The unit neglected to organize corresponding safety drills and perform safety training for construction employees. Also, the construction site's implementation of fire protection and accident prevention was weak.

As a result, if the occurrence happens unexpectedly, staff members are unable to stop the injuries caused by the accident in time. Before starting construction, some companies also neglected to create an acceptable emergency plan, and the safety protection equipment failed to perform the inspection in accordance with the stated standards, resulting in inferior safety protection equipment.

Also, some firms have a tendency to cut the expense of security work in order to maximize the organization's financial gains. This will compromise security because it violates the requirements for using protective equipment. The majority of the safety variables that cause accidents on construction sites are represented in Table 2. Up to 50% of them were height-related falls, whereas 22% involved object strikes, 10% collapse, 11% mechanical damage, and 5% drowning. Hence, the construction unit must put measures in place in accordance with the reasons of its own engineering project accidents in order to reduce the possibility of engineering accidents. This can guarantee that workers can finish the project inside a safe window, advancing the manufacturing implementation process.

Safety factors caused by accidents

Safety Factors	Fall from height	Object strike	Collapse accident	Mechanical damage	Drown
Occupy ratio	50%	22%	12%	11%	5%

Table 2 Safety Factors

According to data reported in the literature, managerial issues, dangerous site circumstances, and workers' risky behaviors are the leading causes of construction accidents in many countries throughout the world. In Malaysia's construction sector, management variables, risky site circumstances, environmental concerns, and the uniqueness of the business are the key accident-causing elements. The main causes of fatal accidents in Singapore are unsafe worker behavior and managerial issues. The distinctive nature of the industry, poor management, dangerous worker conduct, unsafe workplace conditions, and major construction accident rates in Thailand are all factors. In According to research conducted in the UK, the primary causes of occupational accidents are worker behavior, dangerous site conditions, the type or state of the commodities used on-site, and the risk management competence lackness. Construction accidents in Kuwait are mostly brought on by employee issues, management problems, dangerous site circumstances, and the industry's unique traits. In the US, factors relating to employees, management, dangerous site circumstances, physical features, and industry-specific characteristics can contribute to injuries and fatal events. In Spain, management and human factors are the primary causes of deadly construction accidents. Only management factors, hazardous site conditions, and workers' risky behaviors were taken into consideration in the study based on the intersection of the above-mentioned criteria under examination.

The management factors include not providing the necessary personal protective equipment (PPE) for job, a lax quality control method, team behavior, industry tradition, and provision of employees working at elevated heights without sufficien safety measures in place, a shortage of skilled guidance, a lack of able project managers, an absence of safety management guides, an inadequate supply of first aid provisions, lack of management dedication, and the lack of stringent operating course. Falls from considerable heights occur as a result of site supervisor pressure to hasten work, especially in the afternoon. Department of Health of Malaysia (DOSH).

Higher education institutions (HEIs) are frequently thought of as safe havens in the Philippines where young people may learn new things, make friends for life, and expand their knowledge. The task of providing a learning environment that enables pupils to absorb as much information as their brains can handle falls to a student-friendly institution. It's the kind of environment that supports children's healthy development, equips them with the knowledge and skills they're going to need throughout their lives, and trains them to be accountable and valuable contributors to their society as a whole.

The number of safety incidents at schools has, according to research, steadily increased over time. From 69,487 incidents in 2009 to 77,496 incidents in 2010, 86,468 incidents in 2011, 100,365 incidents in 2012, 105,088 incidents in 2013, 116,527 incidents in 2014, and 116,527 incidents in 2015, the number of incidents has increased over time. The Philippines' occupational safety and health standards were established in 1978 in accordance with the requirement imposed by the constitution to safeguard workers' social and economic well-being as well as their physical safety and health. The 1978 Standard is regarded as a turning point in Filipino labor and social legislation because it was accepted through the tried-and-true democratic method of tripartism. (OSH Standards, 1989).

However, CHED and its local commissioners, urged to make sure that "preventive and protective" measures are put in place to ensure the safety of students and teachers. Republic Act (RA) No. 7722, is wholly committed to supporting high-quality, applicable, and successful higher education in the Philippines. Yet, under memorandum instructions that were focused exclusively on engineering initiatives, standard safety measures were not given significant weight

in CHED's rules, regulations, and standards. However, the CHED 40, Series 2008, which went into effect on November 24, 2008, and was published in the Officia Gazette on October 17, 2008, was registered with the ONAR placed a strong emphasis on the safety-related requirements that apply to private higher education institutions. (Ermita, P., & Florencondia, N. September 2019)

The Philippines' president, Rodrigo Duterte, has signed a bill that guarantees workers' comprehensive protection from all occupational hazards and promotes a safe and healthy workplace. Republic Act (RA) 11058 safeguards that the requirements of the labor code, federal laws, and internationally acknowledged standards for occupational safety and health (OSH) are adequately enforced and followed by companies. The aforementioned regulation mandates that every person who achieves, regulates, or supervises the work ensures that employees are safe at work. There shouldn't be any hazardous conditions where employees run the risk of passing away, getting sick, or suffering physical harm.

Synthesis of the Reviewed Literature and Studies

The researcher's conceptualization of this study was guided by the pertinent literature and studies that were reviewed. He learned about the construction industry, the importance of implementing safety management within the construction sector in terms of lack of management control, the fundamental causes or the original causes of incidents or accidents, whether they be personnel factors or job factors, the immediate cause of the accidents, which were the unsafe acts and unsafe conditions at the site, the prevention of incidents and accidents, and more from the ideas and perceptions of the various authors.

Indeed, planning, designing, building, changing, maintaining, repairing, and ultimately demolishing structures, civil engineering projects, mechanical and electrical engineering, and other related operations make up the high-risk industry of construction. (Hillebrandt, 2017).

And in accordance with Peng et al. 2021, this necessitates due to the complexity of construction in the industry, the high demand for engineers, Given the job difficu y factors, construction businesses must actively focus on project safety monitoring and leadership, as well as completely increase their degree of comprehensive management.

Despite the hazards connected with construction sites, Buniya et al. (2021) argue that excellent industrial safety performance and good safety program execution give a variety of benefits. Construction companies' safety management has not yet achieved the required level, and the corporation lacks accountability and the frequency of accidents in recent years. Enterprise engineering construction's implementation of safety management is insufficient..(Bun a el al, 2021).

One benefit of the integration of the work breakdown structures and risk breakdown structures, as stated in the article "Construction Deaths Fall in 2020/21 - Construction Management," may assist decision-makers in using this approach for risk management during the pre-construction phase.

However, Zhang et al. 2017 emphasized that the experts' or managers' competence was first used to identify the potential hazards, which was then eliminated through the necessary preventative measures.

Tayeh et al., 2020 assert that the majority of the H&S-related problems that surfaced during the building phase might be resolved if more effort had been put forward during the project's pre-construction phase.

The researcher was sure that the best method to avoid injuries and accidents during the construction phase is to apply safety management at the start of the pre-construction phase. For this study, it will be advised to use a safety matrix plan at the start of the pre-construction phase. Pre-Construction should receive the same attention as Construction Phase and be closely followed through Post Construction Phase.

Also, the research was given clear directions to follow the findings of other researchers who had conducted the same study by the examined literature and studies on the use of safety management. Their research greatly aided the current study's understanding of

the significance of construction management's involvement in the attainment of safety.

Methodology

Method of Research

A quantitative approach and a descriptive research methodology were utilized by the researcher to identify and assess the concerns found in this research. Descriptive research is a sort of analysis in which features of the population or subject under consideration are described. It emphasizes the "WHAT" of the research more by outlining the characteristics of the demographic category. Descriptive research cannot create a causal chain in which one variable influences another or determine the underlying cause of an event. Its objectives are to define a particular phenomenon and have a comprehensive understanding of it. It often collects quantitative data (numbers, statistics), with uncontrolled factors, using a large sample size.

The researcher chose a quantitative approach since data collecting will be methodical. A descriptive approach was also chosen since the researcher wishes to understand and describe how safety management is applied on construction sites. Descriptive quantitative research is ideally suited to the study due to the benefit of data collection, which produces a wealth of knowledge that can be used for subsequent research or even the creation of a researcher's hypothesis.

Architects, engineers, safety officers and skilled employees all responded to the poll. Age, sex, position, and years of experience were all taken into consideration while choosing them. Respondents were chosen from public sector along with private at the chosen construction enterprises.

The researcher used the following tools in this study to collect all the information required to address the study's specific issues, which fell under the following domains: lack of control (management), fundamental causes (origins), immediate causes (symptoms), incident (an event that could endanger people or property), and accident (loss of properties, people, processes).

After the instruments were developed and validated, the following information was gathered: first, the respondents from the selected construction company were identified; second, they were informed that a survey questionnaire would be sent to them via messenger, email, Google Form, and printed instruments; third, the completed survey questionnaire was followed up with via messenger, email, phone call, and personal visit at site; and fourth, the completed survey questionnaires were gathered.

Population, Sample Size and Sampling Technique

Paper used Non-Probability Sampling approach. The researcher selected the purposive sampling type, using his discretion to choose participants from the population to participate in the study (Crossman, 2018).

The sample size computation made use of the Raosoft Calculator. The values were entered into the Raosof Calculator's fields in the following order: 1. How much room for error can you afford? (5% were chosen by the researcher) 2. What level of assurance do you require? (The researcher made a 95% decision). 3. How many people live there? (Because the population number is uncertain, the researcher used a sample size of 20,000) 4. What is the response distribution? (The researcher chose a response of 50 responses). When all the required information had been entered, the final field showed a suggested sample size of 377.

Description of Respondents

The architects, engineers, safety officials and skilled workers of the selected construction firms in Manila made up the study's population. They were chosen as respondents because they met the requirements for this study.

Research Instrument

The researcher in this study uses the following tools to collect all the information necessary to respond to the study's unique questions. The first section contains details on the age, sex, status, and year of implementation profiles of the selected construction businesses. The survey items in the questionnaire's second part are concerning the evaluation of safety management implementation

of a specific building in Manila with regard to of lack of oversight, right away causes, occurrence (the occasion that may harm either people or property), and accident/loss (properties, people, processes).

The answer mode and numerical equivalent used by the researcher for the modified Five Point Likert Scale are listed below.

Data-Gathering Procedure

After the validation of the survey questionnaires, the researcher sought an approval and asked permission and from his adviser to distribute the questionnaires to the respondents from the selected construction companies in Manila via messenger, google form and via email. The survey questionnaires were being retrieved via messenger, google form and email from the respondents. The data collected were tabulated in the MS excel.

Statistical treatments were applied for analysis and interpretation.

Item	Level	Scale	Definition
Fully Implemented	5	4.21 – 5.00	Downgraded to "Implemented" level, having five ratings lower than 4
Implemented	4	3.41 – 4.20	Downgraded to "Somewhat Implemented" level having five ratings lower than 3
Somewhat Implemented	3	2.61 – 3.40	Downgraded to "Less Implemented" having five ratings lower than 2
Less Implemented	2	1.81 – 2.60	Downgraded to" Not Implemented" having five ratings lower than 1
Not Implemented	1	1.00 – 1.80	Not Implemented

Table 3 The Five Point Likert Scale

Statistical Treatment of Data

In analyzing the data gathered, descriptive and inferential statistical tools were utilized to the following statement of the problem.

For the SOP #1, "What is the profile of the respondents in terms of age, sex, position, and years of experience? The statistical treatment of data was descriptive and used the mean in computing the average of the data and utilized standard deviation in measuring dispersion around the mean.

For the SOP #2, "How do the respondents assess the implementation of safety management of selected construction companies in terms of lack of control (management), basic causes, immediate causes, incident and accident?" The statistical treatment of data was descriptive and used the mean in computing the average of the data and utilized standard deviation in measuring dispersion around the mean.

For the SOP #3, "Is there a significant difference in the assessments of the respondents on the implementation of safety management of construction companies when grouped according to profile?' The test used for the Normality of Data was Shapiro-Wilk W test. The statistical treatment of data used was Kruskal-Wallis H – test and Mann-Whitney U test for not normally distributed data. This tool was used in drawing conclusions regarding the significant differences of population means since there were more than two comparison groups involved.

RESULTS AND DISCUSSION

In this chapter, the data acquired from the questionnaires that the researchers created for this study are discussed along with their analysis and interpretations. Additionally,

As shown in Table 4, the age bracket 25 years

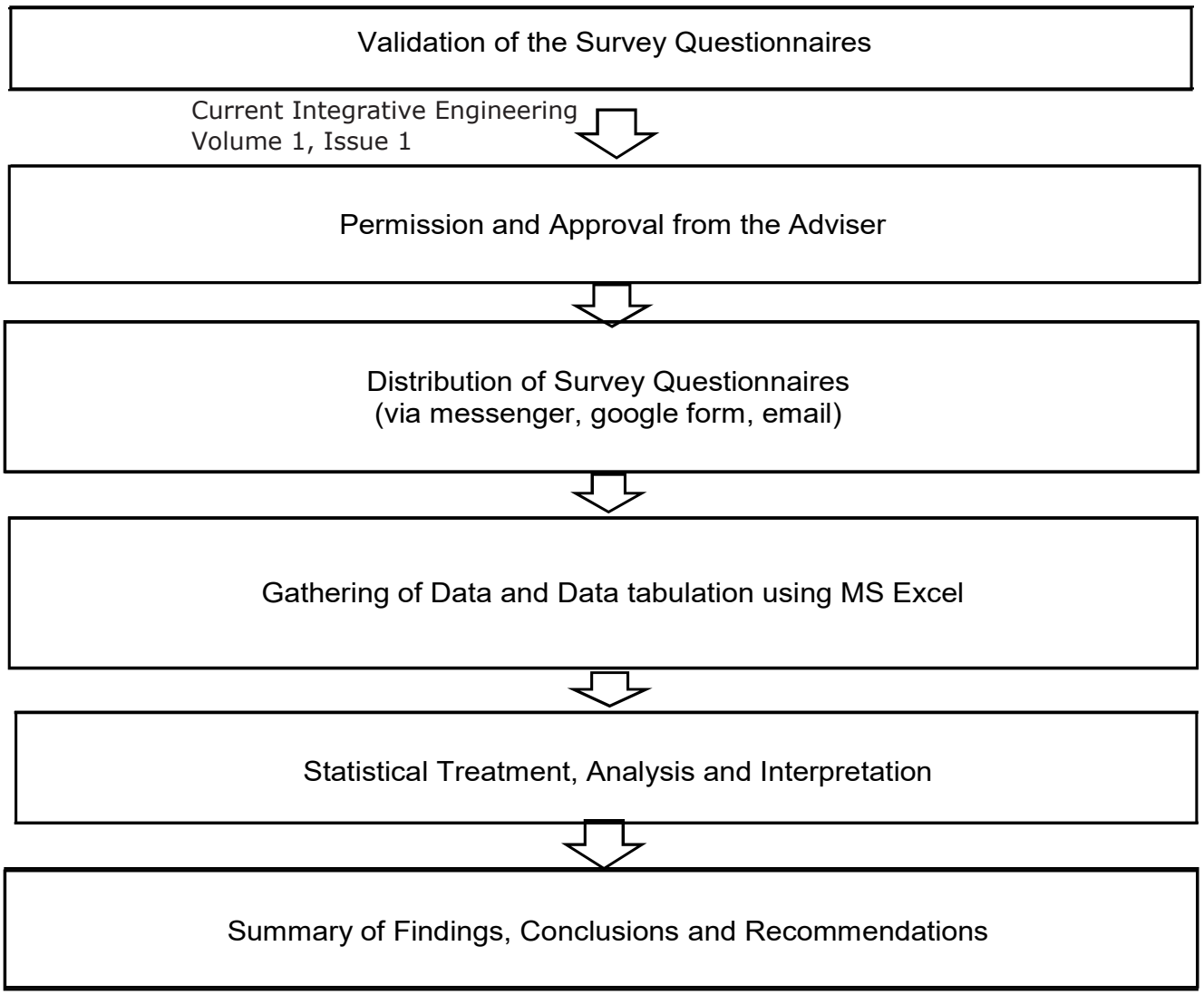

Figure 3. Data Gathering Procedure

old & and below posted the highest percentage which is 39.42% or 149 respondents out of 378 of the total respondents. The second highest is 27.78% or 105 respondents out of 378 of the total respondents. The third highest is 17.72% or 67 respondents out of 378 of the totalrespondents. The fourth highest is 11.905 or 45 respondents out of 378 of the total respondents. On the other hand, lowest percentage is 3.17% or 12 respondents are aged 56 years old & above.

Age Bracket	Frequencey	Percentage
25 years old-below	149	39.42
26-35 years old	105	27.78
36-45 years old	67	17.72
46-55 years old	45	11.90
56 years old-above	12	3.17
Total	378	100.00

to Table 4: Profile of the respondents according their Age Bracket

the statistics pertaining to the issues listed in the Statement of the Problem (SOP) in Chapter 1 are provided in this chapter. The information in this chapter was structured in accordance with the issues addressed in the research.

Table 5 shows the percentage of respondents in terms of sex. From those that had been surveyed, the male respondents dominated the survey with 84.39% or 319 respondents out of 378 of the total respondents. The percentage

Sex	Frequency	Percentage
Male	319	84.39
Female	59	15.61
Total	**378**	**100.00**

**Used Mann-Whitney U test*

Table 5: Gender

of females is 15.61% or 59 respondents out of 378 of the total respondents.

Table 6: Profile of the respondents according to Position in the Company. As presented in

Position in the Company	Frequency	Percentage
Architect	14	3.70
Engineer	106	28.04
Safety Officer	13	3.44
Skilled Worker	245	64.81
Total	**378**	**100.00**

Table 6, the highest percentage is 64.81% or 245 respondents which is dominated by the skilled workers out of the 378 total.

respondents. The second highest percentage is 28.04% composed of engineers with 106 respondents. The third highest percentage is 3.70 or 14 architects out of 378 of the total respondents. The lowest percentage is 3.44% or 13 safety officer out of 378 respondents. The above table shows that most of the respondents' assessment on the safety management of selected construction companies in Manila according to the domain "lack of control" is "Implemented" as manifested also on the grand mean of 3.99. Items 1 to 14 under the domain "lack of control" have a verbal description of "Implemented." however based on the definition set in the Likert Scale that if the total rating per item consists of more than 5 ratings lower than 4, the level of implementation will be downgraded to the next level which is "Somewhat Implemented". Based on the data gathered, all of the items have a weighted mean under domain "lack of control" have more than 5 ratings lower than 4 therefore the level of implementation on this domain is "Somewhat Implemented".

Item 1.11 "Project engineer provided visible safety warnings at construction site" posted the highest mean with a rating of 4.18. Most of the sites that the researcher visited have tarpaulins on safety and/or warning signs that

Years of Experience	Frequency	Percentage
5 years - below	228	60.32
6 – 10 years	82	21.69
11 – 15 years	28	7.41
16 – 20 years	16	4.23
21 – 25 years	15	3.97
26 years - above	9	2.38
Total	**378**	**100.00**

Table 7: Profile of the respondents

are visible near the entrance gate however, the researcher observed that most of the projects have insufficien visibility of warning signs within the construction site. It is therefore recommended to place additional, essential safety or warning signs in strategic spots throughout the construction site.

The lowest mean is under item 1.5 "The management provided COSH training to project engineers and supervisors assigned at site". Among the 14 items under the lack of control

of the management with a mean of 3.77. The researcher recommends to the company to hire architects and engineers with a certificate on COSH training or the company should invest to engineers and supervisors that are being hired with no COSH training yet by providing them training that eventually reap rewards in many forms including the financial aspects. According to Buniya et al 2021, "there are numerous benefits of good safety performance in the construction industry associated with the effecti e implementation of safety programs."

ITEMS	**MEAN**	**VERBAL DESCRIPTION**
Lack of control (Management)		
Management proactively plan on safety for workers by providing orientation on Safe Working Method Statements (SWMS) prior to deployment at site	4.05	Implemented
The management dedicated a safety officer at the construction site as per OSHA requirement	4.07	Implemented
The management provided PPE's to the employee as per RA 11058	4.03	Implemented
The safety officer conducted safety orientation prior to deployment of manpower at construction site	4.10	Implemented
The management provided COSH training to project engineers and supervisors assigned at site	3.77	Implemented
The management maintains its high level of hazard awareness especially during graveyard shift	3.91	Implemented
The company provides complete tools and equipment to the workers at site	4.08	Implemented
Calibration of tools conducted regularly by the management	3.90	Implemented
Communication apparatus such as walkie-talkie and the likes were provided at site and during operations by the management	3.94	Implemented
Regular safety walk conducted by the project manager or project engineer to the workers at construction site	3.87	Implemented
Project engineer provided visible safety warnings at construction site	4.18	Implemented
Project engineer provided visible safety warnings at construction site	4.12	Implemented
Toolbox meetings conducted every morning at construction site	4.05	Implemented
Scaffoldings/ladders are complete and are defective free and are calibrated and are installed by competent and by trained personnel	3.83	Implemented
GRAND MEAN	**3.99**	**Implemented**

Table 8: Mean Distribution of the respondents according to their assessment of safety

management of selected construction companies in Manila according to the lack of control.

Legend: *"Not Implemented (1.00 – 1.80)", "Less Implemented (1.81 – 2.60)", "Somewhat Implemented (2.61 – 3.40)", "Implemented (3.41 – 4.20)", "Fully Implemented (4.21 – 5.00.*

The above table shows that most of the respondents' assessment on the safety management of selected construction companies in Manila according to the domain "lack of control" is "Implemented" as manifested also on the grand mean of 3.99. Items 1 to 14 under the domain "lack of control" have a verbal description of "Implemented." however based on the definition set in the Likert Scale that if the total rating per item consists of more than 5 ratings lower than 4, the level of implementation will be downgraded to the next level which is "Somewhat Implemented". Based on the data gathered, all of the items have a weighted mean under domain "lack of control" have more than 5 ratings lower than 4 therefore the level of implementation on this domain is "Somewhat Implemented".

Item 1.11 "Project engineer provided visible safety warnings at construction site" posted the highest mean with a rating of 4.18. Most of the sites that the researcher visited have tarpaulins on safety and/or warning signs that are visible near the entrance gate however, the researcher observed that most of the projects have insufficien visibility of warning signs within the construction site. It is therefore recommended to place additional, essential safety or warning signs in strategic spots throughout the construction site. The lowest mean is under item 1.5 "The management provided COSH training to project engineers and supervisors assigned at site". Among the 14 items under the lack of control of the management with a mean of 3.77. The researcher recommends to the company to hire architects and engineers with a certificate on COSH training or the company should invest to engineers and supervisors that are being hired with no COSH training yet by providing them training that eventually reap rewards in many forms including the financial aspects. According to Buniya et al 2021, "there are numerous benefits of good safety performance in the construction industry associated with the effecti e implementation of safety programs." Table above shows that most of the respondents' assessment on the safety management of selected construction companies in Manila according to Basic Causes is "Implemented" as manifested also on the Grand mean of 3.85. Items 1 through 14 in the domain of "Basic Causes" have verbal descriptions of "Implemented," but according to the definition established in the Likert Scale, the level of implementation will be downgraded to the next level, which is "Somewhat Implemented," if the total rating per item consists of more than 5 ratings lower than 4. According to the data acquired, the domain "Basic Causes" has a "Somewhat Implemented" degree of implementation because all of the items have a weighted mean under that domain and more than fi e items have scores below 4. Item 2.4 "Provided protection for people on the ground from falling objects" shows the highest mean among the 8 items with a rating of 4.08 with a verbal description of "Implemented". Items 1 through 8 in the domain "Basic Causes" have a verbal description of "Implemented," but according to the definition established at the Likert Scale, the level of implementation will be downgraded to the next level, which is "Somewhat Implemented," if the total rating per item consists of more than 5 ratings lower than 4. Based on the data gathered, if items have a weighted mean under the domain "Basic Causes" have more than 5 ratings lower than 4 therefore, the level of implementation on this domain is "Somewhat Implemented". The researcher spoke with a safety office by chance in one of the construction sites, and learned that the nearby building site does not fully comply with the requirements for protecting those working on the ground from falling objects. He told the researcher that he would discuss the problem with the safety office of the adjoining building in order to avoid any potential harm or mishap. Also, the researcher physically witnessed a piece of steel fall from the sky during a construction project and land close to where they were

ITEMS	MEAN	VERBAL DESCRIPTION
Basic Causes (Personnel factors and Job factors)		
Workers have completed training on the proper usage of tools and equipment to be used at site	3.94	Implemented
Workers have conducted proper maintenance of tools regularly	3.76	Implemented
Provided complete fall protection for workers on elevated structures	4.02	Implemented
Provided protection for people on the ground from falling objects	4.08	Implemented
Provided missing guards or protections on power tools	3.97	Implemented
Management conducted daily exercise every morning to monitor their health prior to deployment of workers to their respective assignments	3.74	Implemented
Workers were trained to apply 5'S at site. (Sort, set in order, Shine, Standardize, Sustain)	3.60	Implemented
Workers were trained to handle toxic substance for their safety as per MSDS (Material Safety Data Sheet) guide.	3.65	Implemented
GRAND MEAN	**3.85**	**Implemented**

Table 9: Mean Distribution of the respondents according to their assessment of safety management of selected construction companies in Manila according to basic cause

Legend: *"Not Implemented (1.00 – 1.80)", "Less Implemented (1.81 – 2.60)", "Somewhat Implemented (2.61 – 3.40)", "Implemented (3.41 – 4.20)", "Fully Implemented (4.21 – 5.00)"*

The above table shows that most of the respondents' assessment on the safety management of selected construction companies in Manila according to the domain "lack of control" is "Implemented" as manifested also on the grand mean of 3.99. Items 1 to 14 under the domain "lack of control" have a verbal description of "Implemented." however based on the definition set in the Likert Scale that if the total rating per item consists of more than 5 ratings lower than 4, the level of implementation will be downgraded to the next level which is "Somewhat Implemented". Based on the data gathered, all of the items have a weighted mean under domain "lack of control" have more than 5 ratings lower than 4 therefore the level of implementation on this domain is "Somewhat Implemented".

Item 1.11 "Project engineer provided visible safety warnings at construction site" posted the highest mean with a rating of 4.18. Most of the sites that the researcher visited have tarpaulins on safety and/or warning signs that are visible near the entrance gate however, the researcher observed that most of the projects have insufficien visibility of warning signs within the construction site. It is therefore recommended to place additional, essential safety or warning signs in strategic spots throughout the construction site. The lowest mean is under item 1.5 "The management provided COSH training to project engineers and supervisors assigned at site". Among the 14 items under the lack of control of the management with a mean of 3.77. The researcher recommends to the company to hire architects

ITEMS	MEAN	**VERBAL DESCRIPTION**
Immediate Causes		
PPE is complete and appropriately and properly worn by the workers always	3.98	Implemented
Only qualified or authorized personnel operated the tools and equipment at site	4.07	Implemented
Workers use tools or equipment that are calibrated and properly working	3.97	Implemented
Workers use tools or equipment that have protection, warning devices and without bypassing safety warnings.	3.98	Implemented
Workers focus on work and do not indulge in horseplay at work	4.01	Implemented
Cellphones were allowed to use by the workers as necessary at construction site	3.60	Implemented
Holes are properly and safely secured at construction site	4.19	Implemented
Sufficient lighting is provided at construction site	4.21	Fully Implemented
Rail guards are provided at construction site	4.05	Implemented
There are assign guards during point of operation	3.90	Implemented
Workers should stay out under a suspended load	4.14	Implemented
Always start machinery with warning devices	4.06	Implemented
GRAND MEAN	**4.01**	Implemented

Table 10: Mean Distribution of the respondents according to their assessment of safety

Legend: *"Not Implemented (1.00 – 1.80)", "Less Implemented (1.81 – 2.60)", "Somewhat Implemented (2.61 – 3.40)", "Implemented (3.41 – 4.20)", "Fully Implemented (4.21 – 5.00)".*
Table 10: Mean Distribution of the respondents according to their assessment of safety management of selected construction companies in Manila according to "Immediate Causes"

and engineers with a certificate on COSH training or the company should invest to engineers and supervisors that are being hired with no COSH training yet by providing them training that eventually reap rewards in many forms including the financial aspects. According to Buniya et al 2021, "there are numerous benefits of good safety performance in the construction industry associated

construction companies in Manila according to Immediate Causes is "Implemented" as manifested also on the Grand mean of 4.01. Items 1 through 12 in the "Immediate Causes" domain have verbal descriptions of "Implemented," but in accordance with the definition given in the Likert Scale, the level of implementation will be downgraded to the next level, "Somewhat Implemented," if the total of all ratings for each item is made up of more than 5 ratings below 4. The data collected indicate that ratings consist of more than 5 ratings lower than 4 therefore the level of implementation for the domain "Immediate Causes" is Somewhat Implemented.

The highest rating among the 12 items under the "Immediate Causes" is item number 3.8 "Sufficien lighting is provided at construction site" with a mean of 4.21 and with a verbal description of "Fully Implemented". But in accordance with the definition given in the Likert Scale, the level of implementation will be downgraded to the next level, " if the rating per item obtained from the respondents consists of more than 5 ratings lower than 4. Based on the data gathered, the line item has more than 5 scores lower than 4; therefore the verbal description for this item is "Implemented".

The lowest rating among the 12 items under the "Immediate Causes" is item number 3.6 "Cellphones were allowed to use by the workers as necessary at construction site" with a rating of 3.60. and with a verbal description of "Implemented". Based on the data gathered, the line item number 3.6 has more than 5 scores lower than 4 therefore the verbal description for this item is downgraded to "Somewhat Implemented". management of selected construction companies in Manila according to "Incident"

The above table shows that most of the respondents' assessment on the safety management of selected construction companies in Manila according to Immediate Causes is "Implemented" as manifested also on the Grand mean of 4.11. Items 1 through 5 in the domain "Incidents" have verbal descriptions of "Implemented," but in accordance with the definition given in the Likert Scale, the level of implementation will be downgraded to the next level, "Somewhat Implemented," if the total of all ratings for each item is made up of more than 5 ratings below 4. The data collected indicate that ratings consist of more than 5 ratings lower than 4 therefore the level of implementation for the domain "Immediate Causes" is Somewhat Implemented.

ITEMS	**MEAN**	**VERBAL DESCRIPTION**
Incidents		
Incidents or near misses are immediately reported within 24 hours to the project manager by the workers at site	4.20	Implemented
Incidents and near misses are discussed immediately at the safety meting or toolbox meetings to avoid its recurrence	4.08	Implemented
Identified potential occurrence of incidents in advance in the pre-construction phase by the management	4.01	Implemented
Incidents risk level for a certain unit of work are identified proactively	4.00	Implemented
Management Enforce mandatory break times to workers	4.25	Fully Implemented
GRAND MEAN	**4.11**	**Implemented**

Table 11: Mean Distribution of the respondents according to their assessment of safety

Legend: *"Not Implemented (1.00 – 1.80)", "Less Implemented (1.81 – 2.60)", "Somewhat Implemented (2.61 – 3.40)", "Implemented (3.41 – 4.20)", "Fully Implemented (4.21 – 5.00)"*

The highest rating among the 12 items under the "Immediate Causes" is item number 3.8 "Sufficien lighting is provided at construction site" with a mean of 4.21 and with a verbal description of "Fully Implemented". But in accordance with the definition given in the Likert Scale, the level of implementation will be downgraded to the next level, " if the rating per item obtained from the respondents consists of more than 5 ratings lower than 4. Based on the data gathered, the line item has more than 5 scores lower than 4; therefore the verbal description for this item is "Implemented".

The lowest rating among the 12 items under the "Immediate Causes" is item number 3.6 "Cellphones were allowed to use by the workers as necessary at construction site" with a rating of 3.60. and with a verbal description of "Implemented". Based on the data gathered, the line item number 3.6 has more than 5 scores lower than 4 therefore the verbal description for this item is downgraded to "Somewhat Implemented".

The majority of businesses continue to underestimate the value of holding a communication day on safety and instead see it as a significant additional investment. Getting everyone together to talk about safety issues already costs the business a lot of money in terms of profits. Few businesses allocate time for this event because it costs a lot of money and results in nothing on that particular day. Overall, the result show that respondents majority believe that safety management of certain construction enterprises in Manila is "Implemented," which is also reflected in the overall mean of 3.99. The overall mean for the level of safety management is "Somewhat Implemented" since all of the sub-means achieved a degree of implementation on safety management that is described by the Likert Scale as "Somewhat Implemented" according to the data collected with more than 5 ratings lower than 4.

ITEMS	**MEAN**	**VERBAL DESCRIPTION**
Accidents		
Scheduled regular safety meetings to ensure the new employees are aware of safety measures	4.03	Implemented
Communication Day on safety is being held regularly	3.95	Implemented
Taking note of previous accidents where, when, and how the accident occurred and are used during toolbox meetings	3.99	Implemented
Company reviewed the mishaps that occurred throughout the construction process in order to avoid such scenarios in the future	3.98	Implemented
Management preserved any accident evidence that may be needed for proper investigation and in claiming damages	4.02	Implemented
GRAND MEAN	**3.99**	**Implemented**

Table 12: Mean Distribution of the respondents according to their assessment of safety

	MEAN	VERBAL DESCRIPTION
Evaluation of security of chosen organisation within the construction sector in Manila.	3.99	Implemented

Table 13: Over-all Mean Distribution of the respondents according to their evaluation of security of chosen organisation within the construction sector in Manila

Legend: *"Not Implemented (1.00 – 1.80)", "Less Implemented (1.81 – 2.60)", "Somewhat Implemented (2.61 – 3.40)", "Implemented (3.41 – 4.20)", "Fully Implemented (4.21 – 5.00)"*

Variable	Sample Size	p-value	Remarks
Evaluation of security of chosen organisation within the construction sector in Manila.	378	0.0000	Not Normal

Table 14: Test for Normality of Data using Shapiro-Wilk W test.

3. Is there any significant difference in the assessments of the respondents on the implementation of safety management of construction companies when grouped according to profile?

Based on the table above, the computed p-value using Shapiro-Wilk test in testing the normality of data collected is less than the set significance level at 0.05 which implies that the data gathered are not normally distributed. Based on standard, it is recommended that the advisable Inferential statistical tools to be used in the study is a non-parametric statistical test. (*Mann-Whitney U test)
Lack of control, fundamental causes, and urgent causes do not significantly differ when grouped by sex profile, whereas event and accident do. The majority of women made up all of the mean ranks within the sex profile. Due to their greater attention to detail than male workers, skilled female workers are in greater demand in the construction industry. Also, the researcher conducted a casual chat with a few of the talented female employees who worked for the construction company, with the majority of the women being allocated to the painting department.

With scores of 182.50 and 1.83.41, respectively, incident and accident have the two lowest mean ranks when grouped according to profile on the substantial difference on the respondent's appraisal of safety management of the selected construction business in Manila. Male skilled workers made up the majority of respondents (64.81%, or 245 respondents), and respondents under the age of 25 made up 39.42%, or 149 respondents, according to the study's findings. Due to their lack of safety expertise, male respondents tended to feel that accidents and incidents are less likely to occur.. Peng, R., Zhang, M., & Liu (2021) believe that in addition to financial incentives, companies should be forced to offer safety training to employees. (*Kruskal-Wallis H – test).

The management side's lack of control had the highest mean rank when categorized by age profile, receiving a score of 212.95 under the 36- to 45-year-old age range. Since they understand the value of safety management in managing safety controls or measures on the building site, people in the age range of 36 to 45 have a greater level of safety management than people in any other age range. When ranked according to age profile, the variable "immediate causes" has the lowest mean rank, with a score of 158.61. This shows that those who are between the ages of 46 and 55 are viewed as being less strict about establishing safety management in their workplaces.

Variable	Profile	Mean-Rank	p-values	Decision	Remarks
Lack of Control (Management)	Male	185.47	0.0952	Accept null hypothesis (H_0)	Not Significant
	Female	211.28			
Basic Causes	Male	186.99	0.2974	Accept null hypothesis (H_0)	Not Significant
	Female	203.09			
Immediate Causes	Male	184.78	0.0504	Accept null hypothesis (H_0)	Not Significant
	Female	215.03			
Incident	Male	182.50	0.0035	Reject null hypothesis (H_0)	Significant
	Female	227.32			
Accident	Male	183.41	0.0112	Reject null hypothesis (H_0)	Significant
	Female	222.42			

Table 15: Significant Difference on the respondents' evaluation of security of chosen organisation within the construction sector in Manila according to sex profile

When positions are pooled, the architect has the lowest mean rank, and practically every factor received the lowest scores. Basic causes (124.29), immediate causes (152.61), an incident (176.46), an accident, and a lack of management and control (124.29). Nonetheless, the safety office has the greatest mean scores across all domains. This indicates that the safety office has the highest mean rank because he believes that all of the survey questionnaires have a significant impact on the safety of those working in the construction industry, in contrast to the architect who has a low perception of the application of safety management. With a score of 151.61, the group of responders with 26 years of experience has the lowest mean rank under the management's lack of control. The basic cause's lowest mean rank for respondents with 16 to 20 years of experience is 153.31. For respondents with 16 to 20 years of experience, the lowest mean rank in the category of immediate causes is 151.03. The lowest mean rank for the incident is 128.27 among respondents with 21 to 25 years of experience. The accident's lowest mean rank for respondents with 16 to 20 years of experience is 141.13. The accident, the

Variable	Profile	Mean-Rank	p-values	Decision	Remarks
Lack of Control (Management)	25 yr old & below	196.42	0.0846	Accept null Hypothesis (H_0)	Not Significant
	26 – 35 years old	174.95			
	36 – 45 years old	212.95			
	46 – 55 years old	164.54			
	56 years old – above	199.71			
Basic Causes	25 yr old & below	203.97	0.0568	Accept null hypothesis (H_0)	Not Significant
	26 – 35 years old	168.75			
	36 – 45 years old	197.28			
	46 – 55 years old	170.08			
	56 years old – above	220.75			
Immediate	25 yr old & below	202.41	0.1341	Accept null	Not Significant
	26 – 35 years old	179.51			
	36 – 45 years old	193.81			

Table 16 continue....

Causes					
	46 – 55 years old	158.61		hypothesis (H_0)	
	56 years old – above	208.33			
Incident	25 yr old & below	203.93	0.1947	Reject null hypothesis (H_0)	Significant
	26 – 35 years old	174.00			
	36 – 45 years old	188.60			
	46 – 55 years old	174.16			
	56 years old – above	208.54			
Accident	25 yr old & below	207.15	0.0596	Accept null hypothesis (H_0)	Significant
	26 – 35 years old	172.29			
	36 – 45 years old	191.91			
	46 – 55 years old	164.83			
	56 years old – above	200.04			

Table 16: Significant Difference on the respondents' evaluation of security of chosen organisation within the construction sector in Manila according to age profile

Note: *"If p value is less than or equal to the significance level (0.05) reject Ho, otherwise accept Ho."*

Variable	Profile	Mean-Rank	p-values	Decision	Remarks
Lack of Control (Management)	Architect	124.29	0.0035	Accept null Hypothesis (H_0)	Significant
	Engineer	212.43			
	Safety Officer	236.38			
	Skilled Worker	180.82			
Basic Causes	Architect	123.54	0.0138	Reject null hypothesis (H_0)	Significant
	Engineer	205.21			
	Safety Officer	238.92			
	Skilled Worker	183.85			
Immediate Causes	Architect	152.61	0.0003	Reject null hypothesis (H_0)	Significant
	Engineer	221.22			
	Safety Officer	248.27			
	Skilled Worker	174.77			
Incident	Architect	176.46	0.0054	Reject null hypothesis (H_0)	Significant
	Engineer	216.79			
	Safety Officer	232.35			
	Skilled Worker	176.16			
Accident	Architect	144.61	0.0002	Reject null hypothesis (H_0)	Significant
	Engineer	219.67			
	Safety Officer	257.77			
	Skilled Worker	175.39			

Table 17 Significant Difference on the respondents' aluation of security of chosen organisation within the construction sector in Manila on the fi e variables according to position profile (*Kruskal Wallis H – test)

Note: *"If p value is less than or equal to the significance level (0.05) reject Ho, otherwise accept Ho."*

Variable	Profile	Mean-Rank	p-values	Decision	Remarks
Lack of Control (Management)	5 years - below	199.39	0.2003	Accept null hypothesis (H_0)	Not Significant
	6 – 10 years	171.5			
	11 – 15 years	201.43			
	16 - 20 years	157.19			
	21 – 25 years	172.53			
	26 years - above	151.61			
Basic Causes	5 years - below	203.43	0.0518	Accept null hypothesis (H_0)	Not Significant
	6 – 10 years	164.29			
	11 – 15 years	178.29			
	16 – 20 years	153.31			
	21 – 25 years	194.57			
	26 years - above	157.17			
Immediate Causes	5 years - below	202.01	0.1362	Accept null hypothesis (H_0)	Not Significant
	6 – 10 years	170.36			
	11 – 15 years	178.23			
	16 – 20 years	151.03			
	21 – 25 years	181.47			
	26 years - above	163.83			
Incident	5 years - below	201.84	0.0666	Accept null hypothesis (H_0)	Not Significant
	6 – 10 years	172.95			
	11 – 15 years	185.21			
	16 – 20 years	169.75			
	21 – 25 years	128.27			
	26 years - above	178.17			
Accident	5 years - below	206.26	0.0076	Accept null hypothesis (H_0)	Not Significant
	6 – 10 years	164.91			
	11 – 15 years	184.27			
	16 – 20 years	141.13			
	21 – 25 years	156.60			
	26 years - above	145.94			

Table 18: Significant Difference on the respondents' evaluation of security of chosen organisation within the construction sector in Manila on the five variables according to years of experience profile (*Kruskal-Wallis H – test)

Note: *"If p value is less than or equal to the significance level (0.05) reject Ho, otherwise accept*

basic cause, and the event with 26 years or more of experience were, respectively, the three factors with the three lowest mean ranks among the fi e. The incident with 16 to 20 years of experience and the lack of control had the two other variables with the two lowest mean rankings. Grouping experience levels by years of experience revealed that those with 5 years or less of experience consistently had the highest mean rank. According to individuals with fi e years or less of experience, adopting safety management on the construction site was essential, as seen by this. Since the computed p-value (0.0035) is less than the predetermined significance level at 0.05, which indicates statistically that we were able to accept the null hypothesis, the table above demonstrates that the respondents' assessment of the safety management of particular construction companies in Manila in terms of Lack of Control according to profile is significant only on the position of the respondents. The other profiles, however, are not significant. This suggests that the respondents' positions affected how they evaluated them.

Variable	**Profile**	**Mean-Rank**	**p-values**	**Decision**	**Remarks**
Basic Causes	25 years old - below	203.97	0.0568	Accept null hypothesis (H_0)	Not Significant
	26 – 35 years old	168.75			
	36 – 45 years old	197.28			
	46 – 55 years old	170.08			
	56 years old - above	220.75			
	Male	186.99	0.2974	Accept null hypothesis (H_0)	Not Significant
	Female	203.09			
	Architect	123.54	0.0138	Reject null hypothesis (H_0)	Significant
	Engineer	205.21			
	Safety Officer	238.92			
	Skilled Worker	183.85			
	5 years - below	203.43	0.0518	Accept null hypothesis (H_0)	Not Significant
	6 – 10 years	164.29			
	11 – 15 years	178.29			
	16 – 20 years	153.31			
	21 – 25 years	194.57			
	26 years - above	157.17			

Table 19: Significant Difference on the respondents' evaluation of security of chosen organisatio within the construction sector in Manila in terms of Lack of Control according to profile

Note: *"If p value is less than or equal to the significance level (0.05) reject Ho, otherwise accept Ho." (Kruskal-Wallis H – test and Mann-Whitney U test)*
Note: *"If p value is less than or equal to the significance level (0.05) reject Ho, otherwise accept Ho.".*

Variable	Profile	Mean-Rank	p-values	Decision	Remarks
Lack of Control (Management)	25 years old - below	196.42	0.0846	Accept null hypothesis (H_0)	Not Significant
	26 – 35 years old	174.95			
	36 – 45 years old	212.95			
	46 – 55 years old	164.54			
	56 years old - above	199.71			
	Male	185.47	0.0952	Accept null hypothesis (H_0)	Not Significant
	Female	211.28			
	Architect	124.29	0.0035	Reject null hypothesis (H_0)	Significant
	Engineer	212.43			
	Safety Officer	236.38			
	Skilled Worker	180.82			
	5 years - below	199.39	0.2003	Accept null hypothesis (H_0)	Not Significant
	6 – 10 years	171.5			
	11 – 15 years	201.43			
	16 – 20 years	157.19			
	21 – 25 years	172.53			
	26 years - above	151.61			

Table 20: Kruskal-Wallis H – test and Mann-Whitney U test: Significant Difference on the

Since the computed p-value (0.0035) is less than the predetermined significance level at 0.05, which indicates statistically that we were able to accept the null hypothesis, the table above demonstrates that the respondents' assessment of the safety management of particular construction companies in Manila in terms of Lack of Control according to profile is significant only on the position of the respondents. The other profiles, however, are not significant. This suggests that the respondents' positions affected how they evaluated them.

respondents' evaluation of security of chosen organisation within the construction sector in Manila in terms of Basic Causes according to profil

Variable	Profile	Mean-Rank	p-values	Decision	Remarks
Immediate causes	25 years old - below	202.41	0.1341	Accept null hypothesis (H_0)	Not Significant
	26 – 35 years old	179.51			
	36 – 45 years old	193.81			
	46 – 55 years old	158.61			
	56 years old - above	208.33			
	Male	184.78	0.0504	Accept null hypothesis (H_0)	Not Significant
	Female	215.03			
	Architect	152.61		Reject null hypothesis	
	Engineer	221.22			
	6 – 10 years	170.36	0.1362	null hypothesis (H_0)	Not Significant
	11 – 15 years	178.23			
	16 – 20 years	151.03			
	21 – 25 years	181.47			
	26 years - above	163.83			

Table 21: Kruskal-Wallis H – test and Mann-Whitney U test: Significant Difference on the respondents' evaluation of security of chosen organisation within the construction sector in Manila in terms of Immediate Causes according to profile

Note: *"If p value is less than or equal to the significance level (0.05) reject Ho, otherwise accept Ho."*

The table above exhibits that the respondents' assessment on the safety management of selected construction companies in Manila in terms of Basic Causes according to profile is significant only on the position of the respondents since the computed p-value (0.0138) is less than the set significance level at 0.05 which statistically means that we were able to accept the null hypothesis. While the other profiles are not significant. This indicates that the position of the respondents matters on their assessment.

The table above exhibits that the respondents' assessment on the safety management of selected construction companies in Manila in terms of Immediate Causes according to profile is significant only on the position of the respondents since the computed p-value (0.0003) is less than the set significance level at 0.05 which statistically means that we were able to accept the null hypothesis. While the other profiles are not significant. This indicates that the position of the respondents matters on their assessment.

Variable	Profile	Mean-Rank	p-values	Decision	Remarks
Incident	25 years old - below	203.93	0.1947	Accept null hypothesis (H_0)	Not Significant
	26 – 35 years old	174.00			
	36 – 45 years old	188.60			
	46 – 55 years old	174.16			
	56 years old - above	208.54			
	Male	182.50	0.0035	Reject null hypothesis (H_0)	Significant
	Female	227.32			
	Architect	176.46	0.0054	Reject null hypothesis (H_0)	Significant
	Engineer	216.79			
	Safety Officer	232.35			
	Skilled Worker	176.16			
	5 years - below	201.84	0.0666	Accept null hypothesis (H_0)	Not Significant
	6 – 10 years	172.95			
	11 – 15 years	185.21			
	16 – 20 years	169.75			
	21 – 25 years	128.27			
	26 years - above	178.17			

Table; 22 Kruskal-Wallis H – test and Mann-Whitney U test: Significant Difference on the respondents' evaluation of security of chosen organization within the construction sector in Manila in terms of Incident according to profile

Note: *"If p value is less than or equal to the significance level (0.05) reject Ho, otherwise accept Ho."*

respondents' evaluation of security of chosen organisation within the construction sector in Manila in terms of Accident according to profile

The table above exhibits that the respondents' assessment on the safety management of selected construction companies in Manila in terms of Incidents according to profile is significant only on the sex and position of the respondents since the computed p-values (0.0035 and 0.0054) are less than the set significance level at 0.05 which statistically means that we were able to accept the null hypothesis.While the other profiles are not significant. This indicates that the sex and position of the respondents matters on their assessment in. The table above exhibits that the respondents' assessment on the safety management of selected construction companies in Manila in terms of Accidents according to profile is significant only on the sex and position of the respondents since the computed p-values (0.0112 and 0.0002) are less than the set significance level at 0.05 which statistically means that we were able to accept the null hypothesis. While the other profiles are not significant. This indicates that the sex and position of the respondents matters on their assessment.

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Variable	Profile	Mean-Rank	p-values	Decision	Remarks
Incident	25 years old - below	203.93	0.1947	Accept null hypothesis (H_0)	Not Significant
	26 – 35 years old	174.00			
	36 – 45 years old	188.60			
	46 – 55 years old	174.16			
	56 years old - above	208.54			
	Male	182.50	0.0035	Reject null hypothesis (H_0)	Significant
	Female	227.32			
	Architect	176.46	0.0054	Reject null hypothesis (H_0)	Significant
	Engineer	216.79			
	Safety Officer	232.35			
	Skilled Worker	176.16			
	5 years - below	201.84	0.0666	Accept null hypothesis (H_0)	Not Significant
	6 – 10 years	172.95			
	11 – 15 years	185.21			
	16 – 20 years	169.75			
	21 – 25 years	128.27			
	26 years - above	178.17			

Table 23: Kruskal-Wallis H – test and Mann-Whitney U test: Significant Difference on the

Note: *"If p value is less than or equal to the significance level (0.05) reject Ho, otherwise accept Ho.".*

respondents' evaluation of security of chosen organisation within the construction sector in Manila in terms of Accident according to profile

The table above exhibits that the respondents' assessment on the safety management of selected construction companies in Manila in terms of Incidents according to profile is significant only on the sex and position of the respondents since the computed p-values (0.0035 and 0.0054) are less than the set significance level at 0.05 which statistically means that we were able to accept the null hypothesis. While the other profiles are not significant. This indicates that the sex and position of the respondents matters on their assessment in.

Variable	Profile	Mean-Rank	p-values	Decision	Remarks
Accident	Less than 25 year of age	207.15	0.0596	Accept null hypothesis (H_0)	Not Significant
	26 to 35 year of age	172.29			
	36 to 45 year of age	191.91			
	46 to 55 years of age	164.83			
	More than 56 year	200.04			
	Male	183.41	0.0112	Reject null hypothesis (H_0)	Significant
	Female	222.42			
	Architect	144.61	0.0002	Reject null hypothesis (H_0)	Significant
	Engineer	219.67			
	Safety Officer	257.77			
	Skilled Worker	175.39			
	5 years - below	206.26	0.0076	Accept null hypothesis (H_0)	Not Significant
	6 to 10 years	164.91			
	11 to 15 years	184.27			
	16 to 20 years	141.13			
	21 to 25 years	156.60			
	26 years - above	145.94			

Table 24: Correlation Coefficient Matrix of the variables on assessment of safety management c selected construction companies in Manila.

Note: *"If p value is less than or equal to the significance level (0.05) reject Ho, otherwise accept Ho."*

The table above exhibits that the respondents' assessment on the safety management of selected construction companies in Manila in terms of Accidents according to profile is significant only on the sex and position of the respondents since the computed p-values (0.0112 and 0.0002) are less than the set significance level at 0.05 which statistically means that we were able to accept the null hypothesis. While the other profiles are not significant. This indicates that the sex and position of the respondents matters on their assessment.

Variables	Correlation Coefficients	Interpretation	p-values	Remarks
Lack of Control vs Basic Cause	0.85	Positive Very Strong Relationship	0.0000	Significant
Lack of Control vs Immediate Cause	0.80	Positive Very Strong Relationship	0.0000	Significant
Lack of Control vs Incident	0.72	Positive Strong Relationship	0.0000	Significant
Lack of Control vs Accident	0.78	Positive Strong Relationship	0.0000	Significant
Basic Cause vs Immediate Cause	0.84	Positive Very Strong Relationship	0.0000	Significant
Basic Cause vs Incident	0.72	Positive Strong Relationship	0.0000	Significant
Basic Cause vs Accident	0.77	Positive Strong Relationship	0.0000	Significant
Immediate Cause vs Incident	0.72	Positive Strong Relationship	0.0000	Significant
Immediate Cause vs Accident	0.75	Positive Strong Relationship	0.0000	Significant
Incident vs Accident	0.80	Positive Very Strong Relationship	0.0000	Significant

**Used Spearman Rho Correlation*

Table above shows that all variables on evaluation of security of the chosen organisation within the construction sector in Manila are all positively correlated with each other, ranging from Very Strong to Strong relationships. This indicates that if the respondent's responses on one variable is high it follows also a high response on the rest of the variables and vice versa, and statistically, the computed correlation coefficient are significant at 0.05 significance level.

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS SUMMARY

This section summarizes the findings, conclusions, and suggestions drawn from the research, which was designed to analyze the application of safety management in selected construction enterprises in Manila. The responders were architects, engineers, safety officials and skilled employees from the chosen Manila building firms. Purposive sampling was used to choose them, and quantitative research was used. Survey questionnaires were used to collect relevant data. Percentage, mean, Kruskal-Wallis H - test, and Mann-Whitney U test were utilized as statistical data. The Shapiro-Wilk W test was performed to determine the normality of the data.

ANALYSIS OF FINDINGS

The study's findings were reported in accordance with the issue description mentioned in Chapter 1.

1. Respondent's profile, with respect to position, age, years and sex, of experience.

1.1 The age bracket 25 years old & below posted the highest percentage which is 39.42% or 149 respondents and the lowest percentage is 3.17% or 12 respondents are aged 56 years old & above.

1.2 In terms of sex, the male respondents dominated the survey with 84.39% or 319 respondents out of 378 of the total respondents.

1.3 In terms of position, the skilled workers have the highest percentage which was 64.81% or 245 respondents and the lowest percentage is 3.44% or 13 safety officer

1.4 For years of experience, the highest percentage is 60.32% or 228 respondents with 5 years & below of experience in the industry and the lowest percentage is 2.38% or 9 respondents under the 26 years & and above bracket.

2. Respondents' assessment in the implementation of safety management of selected construction companies in terms of lack of control (management), basic causes, immediate causes, incident and accident.

2.1 The respondents' assessment on the safety management of selected construction companies in Manila according to Lack of Control is "Implemented" as manifested also on the grand mean of 3.99.

2.2 The respondents' assessment on the safety management of selected construction companies in Manila according to Basic Causes is "Implemented" as manifested also on the grand mean of 3.85.

2.3 The respondents' assessment on the safety management of selected construction companies in Manila according to Immediate Causes is "Implemented" as manifested also on the grand mean of 4.01.

2.4 The respondents' assessment on the safety management of selected construction companies in Manila according to Basic Causes is "Implemented" as manifested also on the grand mean of 3.85.

2.5 The respondents' assessment on the safety management of selected construction companies in Manila according to Incidents is "Implemented" as manifested also on the grand mean of 4.11.

2.6 The respondents' assessment on the safety management of selected construction companies in Manila according to Accidents is "Implemented" as manifested also on the grand mean of 3.99.

3. Momentous difference in the assessments of the respondents on the implementation of safety management of construction companies when grouped according to profile.

3.1 Evaluation of the participants with respect to their security in Manila in terms of Lack of Control according to profile is significant only on the position of the respondents since the computed p-value (0.0035) is less than the set significance level at 0.05, which statistically means that we abled to accept the null hypothesis. While the other profiles are not significant. This indicates that the position of the respondents matters on their assessment.

3.2 The respondents' assessment on the safety management of selected construction companies in Manila in terms of Basic Causes according to profile is significant only on the position of the respondents since the computed p-value (0.0138) is less than the set significance level at 0.05 which statistically means that we abled to accept the null hypothesis. While the other profiles are not significant. This indicates that the position of the respondents matters on their assessment.

3.3 The respondents' assessment on the safety management of selected construction companies in Manila in terms of Immediate Causes according to profile is significant only on the position of the respondents since the computed p-value. This indicates that the position of the respondents matters on their assessment.

3.4 The respondents' assessment on the safety management of selected construction companies in Manila in terms of Incidents according to profile is significant only on the sex and position of the respondents since the computed p-values (0.0035 and 0.0054) are less than the set

significance level at 0.05 which statistically means that we abled to accept the null hypothesis. While the other profiles are not significant. This indicates that the sex and position of the respondents matters on their assessment in.

3.5 The respondents' assessment on the safety management of selected construction companies in Manila in terms of Accidents according to profile is significant only on the sex and position of the respondents since the computed p-values. While the other profiles are not significant. This indicates that the sex and position of the respondents matters on their assessment. **CONCLUSIONS**

α. **Respondent profile with respect to their demographic and experience.**

Skilled workers have the highest percentage which was 64.81% or 245 respondents with age bracket 25 years old & below posted the highest percentage which is 39.42% or 149 respondents, and predominantly male.

Respondents' assessment in safety management execution of designated construction companies in terms of lack of control (management), basic causes, immediate causes, incident and accident

The study concludes that the overall level of implementation of safety management on the selected construction companies in Manila is "Implemented" with an overall grand mean of 3.99. The following domains used that contributed to the overall result of grand mean are lack of control (3.99), basic causes (3.85), immediate causes (4.01), incidents (4.11) and accidents (3.99). The fi e domains had a rating of "Implemented" since they were in between 3.41 and 4.20 on the scale. However, based on the criteria used for the Likert Scale, safety management stage of the chosen Manila construction enterprises was lowered from "Implemented" to "Somewhat Implemented" because the mean per item had more than 5 ratings lower than 4.

Important difference in respondents evaluation on the execution of safety management of construction companies when grouped according to profile. Control loss, accidents and Instant Causes are prominent.

RECOMMENDATIONS

There are certain things that are recommended below:

1. The management of the company should be urged to achieve International Organization for Standardization (ISO) accreditation in order to improve their overall degree or level of safety management for the chosen construction companies in Manila.

2. The company should create a Safety Management Working Method Matrix using the integrated Work Breakdown Risk Structure (i-WBRS) format over three phases, namely pre-construction, construction, and post-construction, in relation to control loss, accident and various incidents.

3. BIM (Building Information Modeling) for architects and engineers can assist the organization in raising safety on building projects by creating a virtual model of the project that can be used to identify potential risks and address them before work begins.

4It is suggested that the company spend money on training the architects and engineers to use visualization software programs that can simulate 3D site models since they make it simpler to recognize risks and comprehend employee danger. VR comes under the renowned innovations aids in decreasing workplace accidents (OGD Cruz 2021).

5. It is advised that the management invest in training for his supervisors and skilled workers on how to properly inspect the scaffoldings' completeness, identify and quarantine any defective parts, and replace any defective parts before using them. It is also advised that the management invest in training for its installers.

6. It is advised that management provide an electronic record of the project managers, engineers, and supervisors' quality safety walks at the construction site and pay monetary incentives for achieving a zero accident after their performance evaluation by the end of the year, which is to be given during the Safety Communication Day, which is held twice a year.

7. It is advised that everyone working on a construction site, including the architects, engineers, safety offic s, skilled workers and laborers, receive training on the value of 5'S and how to apply it there. (Sort, Set, Shine, Standardize, and Sustain). With a rating of 3.60, this second-domain item received the lowest grade. Also, it is advised that the engineers and safety officer conducting the safety walk at the site add it to their checklist and address it in the daily toolbox meeting for follow-up and corrections.

8. The management should also make sure that all tools are calibrated and that they are changed right away by the project manager or engineer. Before being reissued at a building site project, the defective tools are then recalibrated and must pass safety and quality assurance with a green sticker. Also, the management should make sure that all tools and equipment are equipped with functional protection and warning mechanisms before they are sent to the building site. PPE must be provided to employees by management, who must also strictly enforce the policy "No PPE worn - No entry at main entrance.".

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