International Journal of Scientific Research and EngineeringDevelopment-Volume 7 Issue 3,May-June 2024
Available at www.ijsred.com

RESEARCH ARTICLE OPEN ACCESS

Field Investigation of Safety Management in The Public and Private Construction Sectors in Pampanga

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Abstract:

The construction industry in the Philippines has significantly developed throughout the years, despite the flourishing phases of progression, change is inevitable and therefore one must adapt to the emerging digital age prior to safety and health. The main objective of this study is to be able to determine the best practices under safety management of the public and private sectors in the province of Pampanga. Moreover, to determine the best practice and its underlying factors that is projected within the construction site. As regards to this study, the Engineering representatives' evaluation towards the administered safety practices, thus its varying factors would help in the improvement of the safety management system in the construction site, where in the long run may lead to mitigate potential risks, to reduce injuries and accidents, promoting a healthy and secured environment in the workplace. A total of 15 factors in line with the paramount of safety and prevention were grouped into 5. The survey was conducted among 377 Engineering representatives of the Public and Private sectors in the province of Pampanga. The level of satisfaction of respondents are tabulated in terms of (1) Conduct Risk Assessments and Hazard Inspections. (2) Implementation of Safety Controls (3) Training on Safety (4) Implementation of Communication and Signage; and (5) Use of Personal Protective Equipment (PPE). The variables were subjected to statistical analysis. The reliability and validity of Cronbach's alpha was utilized, where results were supported as the test is designed to measure internal consistency. The results of the survey revealed that the best practice, which is the safety practice of Use of Personal Protective Equipment (PPE) is by far the most considered safety practice implemented to public and private sectors in Pampanga. The following underlying factors were then assessed and found to be foreseen as something that should be given prior notice to in order to maintain a safe and healthy workplace.

Keywords **—Pampanga, Safety Protocols, Construction, Occupational Safety and Health, Safety Culture**

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I. INTRODUCTION

Construction projects are intricate, challenging, timely, and well-driven for daily convenience. One can define it as a process that involves creating something from a vision, whether it's a physical structure or infrastructure. In the context of construction, it can also refer to a subject under development or the requirement to provide extensive services. To define a project's scope, an ideal number of ways to govern a site's working performance hold project managers accountable for the integration of labour as well as to their stakeholders. This concept is subject to increased efficiency with human involvement. The safety and communication initiatives fostered high-quality work and ethical standards.

As a result, multiple measures are then diversely incorporated to monitor site performance. Predominantly, providing guided evaluation and indispensable feedback created the virtues of purposeful work ethic and competency. Considering measurements secured well-rounded information as well as a systematic way of determining whether the project meets one's objectives. To put this into perspective, the interrogation of how these measurements were fully executed may also be a setback for contractors and project managers. Significantly, safety is the top priority. It is crucial to mention that zero risk is unattainable with the mere fact that safety still suffers from a lack of visibility.

Since construction projects are technologically and organizationally complex, safety management in the building sector is of great importance. However, some research has shown that certain factors, such as management commitment, may have an impact on the safety performance of buildings [1]. To minimize construction accidents, various safety measures have been established and carried out. However, data gathered on construction sites continue to exhibit larger accident and fatality rates than in other businesses. The majority of accidents in the construction industry are caused by system failure, according to investigations into their causes.

One of the sectors that contributed to the high number of accidents was the construction industry. The main key drivers were three elements, i.e., cost, time, and quality, that measured the success of construction projects, but safety and health have been considered taboo. Consequently, several problems have arisen in the area of safety, mainly for daily workers who might be exposed to risks that could arise because of negligence [2]. Therefore, to ensure that the construction site safety management system operates effectively and is a significant factor in active participation in building projects, it should be monitored regularly. In order to overcome this and to ensure the effectiveness of the safety management system through the amendment of the Construction Technology Promotion Act, but in view of the lack of security capacity and staff, the government has emphasized the need for site inspections and planning and implementation confirmation by the public authorities [3].

Both public and private sectors contributed to responsibility and accountability prior to ensuring safety in the workplace. Either way, each sector has a different take in considering various factors like organizational culture, resources and regulatory frameworks. Moreover, understanding these regulations is crucial to determine underlying conditions where the acceptance of improvements can be made. In this way, fallback strategies like conducting risk assessments and safety practices are then implemented to adhere to effective evaluation and feedback mechanisms. By acknowledging the diversity of the public and private sectors, both sectors can work towards the betterment of the workplace. To be able to set standards, as well as creating a safe and healthy environment for involved individuals.

II. REVIEW OF RELATED LITERATURES

A. Safety Management of Construction Projects

To promote a strong safety culture on construction projects, management teams must develop a safety management approach. To achieve this goal, a conceptual skills questionnaire was developed, validated, and used for data collection. Two components of conceptual competence that are important for the safety of buildings were identified by the factor analysis of the collected data: visioning, scoping, and integration. A theoretical model was developed and analysed using the Structural Equation Models (SEM) technique in order to demonstrate that conceptual competence has an influence on construction safety. The results revealed that the conceptual skills allowed project managers to carry out safety management tasks, which in turn promoted a safe working environment for their staff on site.

To verify the results of the SEM study, interviews were conducted with experts, and recommendations for skill development approaches such as lifelong education, practice training, inherent motivation, and special training programs have been made available. In theory, this research will make it possible to build on the current knowledge of conceptual skills and provide empirical evidence for their contribution to better construction safety. In practical terms, the research suggests that construction organizations recognize the importance of the conceptual skills of project managers in the management of construction safety and provide them with appropriate training opportunities to improve these skills [4].

All associated aspects of the project, e.g., site location, workplace conditions or temperature, working space, and appropriate safety arrangements, shall be covered by construction project management. The activity of workers in the construction sector is influenced by dynamic time and space conditions. Therefore, workers working at a height must be protected from falls and ground level workers who are exposed to the movement of vehicles or objects that fall.

The main part of the safety management process is to carry out security checks which actively identify potential risks on site. To increase worksite safety, improve communication efficiency when obtaining and discussing construction safety knowledge. Identifying the criteria to achieve an excellent level of construction safety has become a significant responsibility in safety risk management (RM) [5].

During the construction process, construction firms must adhere to pertinent regulations and industry standards to ensure the safety of all construction activities. Simultaneously, through a thorough analysis of specific circumstances associated with different projects, it is essential to establish a secure environment that offers ample safety assurances for construction personnel, equipment, and the surrounding area. Safety management within construction encompasses overseeing safety throughout the project's lifecycle. This entails that the construction entity and its affiliates must effectively address safety concerns in line with national regulations, enhance safety responsibility management systems, and promote safety awareness among stakeholders.

Building the concept of safe construction towards various approaches is considered to be essential in order to establish construction safety management, as well as to obtain and meet the required standards within the firm. Stating that construction projects are known to be complex thus, can arise numerous hazards, it is just necessary to adopt varying strategies to ensure safety [6].

The construction industry is undeniably significant for economic growth and development. Thus, in line with its dominance in the economy, results in challenging encounters that are faced in the construction site in a day. Workplace accidents in the workplace can lead not only to numerous counts of casualties but can also risk the welfare of individuals and fluctuate economic costs and damages. In addition to this, poor working conditions are persevering issues within the construction firm, not to mention around 81,000 workers reporting work related illnesses in 2020 [7]. Attaining effective construction safety signifies the involvement of presence of work and responsibility of all the stakeholders throughout the process of the entire project. For it provides the accountability of the individuals involved such as engineering representatives, workers to clients in a way of

collaborative effort to ensure the coordination and improvement of the project over time [8].

B. Safety Management in the Philippines

There are occupational health and safety standards in the Philippines. Its main agency was the Department of Labor and Employment. The most important occupational safety and health legislation in the Philippines is the 1978 Occupational Safety and Health Standards. It provides guidance and enforcement for workplaces that include personnel training for safety and health, health and safety committees, occupational illness and accident records, monitoring of occupational and environmental risks, personal protective equipment, safe utilization of materials and machinery, fire protection, and occupational health services [9].

The project risk management system focused on mitigating safety risks on construction sites. To reduce risks and achieve risk management system objectives, appropriate safety protocols must be implemented. This study discovered that on construction sites, some common safety practices have not been properly implemented. The area of concern in the project risk management system has been the mitigation of security risks at construction sites. To effectively control and mitigate safety risks within the workplace, it stresses the need for a comprehensive risk management plan with various levels of security checks [10].

In the Philippines, the vast and growing construction industry causes the increased focus of prioritizing safety and security within the site. This covers the implementation of protective coverings such as the use of personal protective equipment (PPE) and regular maintenance inspections that are conducted to mitigate potential hazards. This explains the importance of introducing safety practices in order to safeguard workers [11].

It is assessed in the construction sector that there are existing staff that are in need of proper guidance towards security management. Compliance with this is to monitor and evaluate individuals regarding the improvement of safety practices as well as to prioritize safety assurance, which eventually will be adapted if servitude and regulations are implemented within the construction industry. There are common injuries at construction sites, such as cuts, abrasions, bruises, and nail punctures, which could have been prevented with appropriate personal protective equipment.

The findings of the study have shown that standard safety practices are not properly applied in actual field conditions, and a number of them do not comply with security requirements. Contractors have not effectively trained and promoted health and safety practices at the construction site. The study recommended that, to promote better safety practices within the construction sector, all workers should be subject to health and safety training as part of their recruitment process [12].

Preventive measures to prevent accidents are needed in order to improve the working environment of a construction site compared with what it is now. That is why we have a new path in the field of construction which focuses on safety—the Construction Occupational Safety and Health (COSH). Some businesses may be unaware of the workplace safety regulations or might not have enough resources to cope with unforeseen circumstances, as a number of companies are still adjusting to the rules and regulations laid down by COSH. The main idea is to carry out a quantitative analysis in order to establish the correlation between safety perceptions of employees and their performance on the job. It is important to know how workers' performance will be influenced by their awareness of the risks in construction sites, given that they have risk exposure [13].

The project's foundation is the Basic Occupational Health Services (BOHS) strategy developed by the World Health Organization (WHO), the International Labor Organization (ILO), and the International Commission on Occupational Health. Primary health care is regarded as the first level of "workers' health care" for approximately 85% of the world's 3.1 billion workers who do not receive expert- based services for occupational health. As is stated in the book “In the Indian context the coverage of such services is minimal for the unorganized sector (informal workers) and

hardly satisfying the expectations of the workers regarding access to interventions and protective measures through basic occupational health services." In the field of prevention of occupational diseases and the development of healthy workplaces in India, there is considerable inequality. Basic care for workers' health should be part of Primary Health Care, as proposed by the authors. Provision of occupational health care could be prioritized "for those in need and at greatest risk, through the financing mechanisms existing for primary health care" [14].

In order to ensure the safety and health of workers in the Philippines' construction sector, Department Order No. 13 Series 1998 emphasizes the importance of periodic training, good equipment and strict adherence to safety standards with a view to ensuring safe working conditions [15]. Health and safety risks to the university community are posed by construction waste and debris. According to the Department of Labor and Employment's (DOLE) Department Order No. 13 series of 1998, or the Guidelines for Governing Occupational Safety and Health in the Construction Industry, Construction Safety Signages should be provided to warn workers and the public of hazards in workplaces, as well as Personal Protective Equipment (PPE) whenever necessary due to the hazardous work process or environment. The provisions relating to the provision of safety signs and devices for warning workers and the public in accordance with the standards laid down by the Government are also repeated under Republic Act 11058 and Department Order No 198. [16].

In 2011, a survey was carried out on the various ongoing projects in Cagayan de Oro City, which consisted of standardized questionnaires and actual field visits. The questionnaires, which included project managers, project engineers, foreman, carpenter, mason, equipment operator, welder, steel worker, electrician and labourer, were filled out by a total of 375 respondents from 36 contractors. Apart from the data obtained from questionnaires, actual field visits were conducted to gather further information using the checklist of Occupational Health and Safety Standard practices of the Department of Labor and Employment's Department Order No. 13. Results revealed that in actual field condition, the standard safety practices were poorly implemented, and, in most cases, the standard safety requirements were just taken for granted. While the contractors were obliged to do their part in educating and promoting 'health and safety' practices in the construction sites, this study proved otherwise [12].

C. Safety Management

Safety management involves the process of determining hazards, evaluating potential risks, and implementing systematic approaches to manage safety and occupational health [17]. A critical aspect of safety management is the proactive approach of management in line with safety and effective risk-based judgment of underlying conditions that has been recurring in the workplace [18]. This commitment is crucial for building a safe culture within the company, this aids as a strong connection between the firm and its people with the help of a shared responsibility and structured behaviours [19]. Furthermore, safety management denotes the involvement of employees as one compromises with the set of standards. This calls for developing the sense of trust and clear communication among individuals, ensuring fairness in safety and critical industries [20]. These dimensions facilitate the growth of a well-built environment for safety, thus will be a succeeding impression of the management towards safety [21]. Additionally, safety management systems (SMSs) are an assessment that provides a broad approach for the current state of the safety culture in the workplace [17].

Safety management is the process that evaluates the risks under safety and health in a project. It outlines a vision of strategies to mitigate potential hazards and probable encounters of challenges that may emerge within the workplace, to lessen the likelihood of risks.

Accidents within the construction industry resulted in injuries and fatalities, cementing the industry's infamous status as the industry that is responsible for the most occupational accidents. As a result, improving safety and health in construction remains a top priority for all construction workers.

Safety management is most likely to consider all potential hazards that could reasonably be expected to endanger project employees in order to reduce such risks. It is thus critical to determine proper safety procedures and approaches for dealing with the potential severe health and safety issues [22].

III. METHODOLOGY

A. *Phase 1 – Literature Review*

In this phase, the procedures were defined and were then organized. The researchers reviewed factors/practices of safety management hence, proceeded by grouping the identified factors.

B. *Phase 2 – Data Collection*

After the comprehensive literature review, the questionnaire was created and validated by Occupational Safety and Health professionals. Data were then gathered using survey questionnaires and were subjected to statistical treatment.

C. *Phase 3 – Data Analysis and Evaluation*

The researchers utilized the Cronbach Alpha Testing to measure the internal consistency ranking of common factors using weighted mean. The measure of Internal consistency using Cronbach's alpha, ranking and analysis of common factors were identified using the raw data from the survey questionnaires.

The statistical tools used are written as follows:

Cronbach's Alpha Testing. In this study, the reliability and degree of the internal consistency of the risk factors discovered were assessed using Cronbach's alpha (Cα). The Cα formula for Likert scale is shown in the equation below.

$$C\alpha = \frac{K}{K-1}\left[1 - \frac{\sum_{i=0}^{k}\sigma_b^2}{\sigma_t^2}\right]$$

Where:
$C\alpha$ = Cronbach's alpha;
K = are many items;
σ_b^2 = variance of test score;
σ_t^2 = variance of items scores after weighing

Weighted Mean. Using mean or average values, the collected data will be analysed and interpreted. The simplest and most commonly used measure of the mean or average is the arithmetic mean.

The following data shall be described:

3.26 – 4.00	Strongly Agree / Excellent
2.51 – 3.25	Agree / Good
1.76 – 2.50	Disagree / Fair
1 – 1.75	Strongly Disagree / Poor

IV. RESULTS AND DISCUSSION

A. *Position or Line of Work*

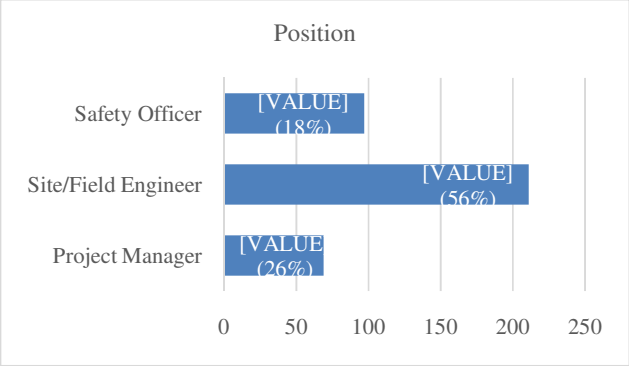

Fig. 4 Bar Chart Showing Percentages of the Respondents' Position in the Company (377 Respondents)

Figure 4 depicts the position within the firm or the respondents' line of work, and it demonstrates that Project Managers represented 18% of the workforce, while Site/Field Engineers made up of 56% and Projects Engineers were 26%.

B. *Project Handled*

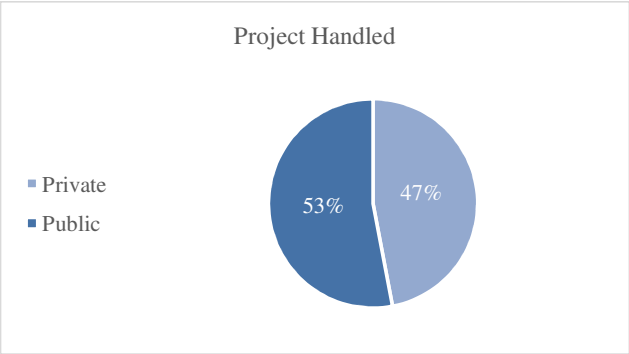

Fig. 5 Pie Chart Showing Percentage of the Project Handled of the Respondents (377 Respondents)

Figure 5 depicts the number of survey respondents by their handled projects. The blue tint represents the 53% private project percentage. For public projects, it is illustrated by the grey colour, which accounts for 47% of the total. The poll respondents handling projects were 201 private and 176 public with a total of 377 respondents. The private-to-public ratio was not predetermined by the researcher; rather, the sample questionnaires were distributed at random.

C. Cronbach Alpha Analysis

TABLE I
CRONBACH ALPHA VALUES

Factors / Practices	No. of Items	Cronbach's Alpha	Interpretation
Conduct Risk Assessments and Hazard Inspections	5	0.958	Excellent
Implementation of Safety Controls	5	0.945	Excellent
Training on Safety	5	0.954	Excellent
Implementation of Communication and Signage	5	0.946	Excellent
Use of Personal Protective Equipment (PPE)	5	0.817	Good

For the five groups and for the total factors, as shown in Table 1, reliability has been measured through Cronbach Alpha. The Cronbach alpha's result was more than 0.70, which means a satisfactory level of reliability has been obtained.

D. Safety Management: Conduct Risk Assessments and Hazard Inspections (Public)

TABLE II
SAFETY MANAGEMENT: CONDUCT RISK ASSESSMENTS AND HAZARD INSPECTIONS (PUBLIC)

Indicators	Weighted Mean	Interpretation
I observe that the risk assessment process is thorough and covers all relevant aspects of the work environment.	3.20	Agree / Good
I prioritize the implementation of safety measures identified in risk assessments.	3.57	Strongly Agree / Excellent
I follow a regular tool box meeting and tool box inspection on our work site to address and mitigate identified hazards.	3.19	Agree / Good
I feel confident in my ability to identify potential hazards during site inspections.	3.26	Strongly Agree / Excellent
I frequently anticipate hazards to appropriately maintain a safe work environment.	3.30	Strongly Agree / Excellent
Overall Weighted Mean	**3.30**	**Strongly Agree / Excellent**

As shown in Table 2, the researchers determined the perceptions of the respondents in terms of conducting risk assessments and hazard inspections of different construction projects in the public sector. The results showed that these indicated factors received a total score of 3.45, which can be classified as Strongly Agree or Excellent. The highest rating was given to the factor that engineering representatives prioritize the implementation of safety measures identified in risk assessments, at 3.57. In addition, the respondents provided comments on additional means and methods used by their sector to promote safety management in construction projects; most of them stated that they were carrying out periodic inspections etc.

Overall, the Safety Management: Conduct Risk Assessments and Hazard Inspections of construction projects of public sectors is Excellent.

E. Safety Management: Implementation of Safety Controls (Public)

TABLE III
SAFETY MANAGEMENT: IMPLEMENTATION OF SAFETY CONTROLS (PUBLIC)

Indicators	Weighted Mean	Interpretation
In order to address emerging risks or changes in legislation, safety controls shall be reviewed and updated on a regular basis.	3.56	Strongly Agree / Excellent
I am aware that all workers are actively involved in the promotion and observance of safety protocols on site.	3.27	Strongly Agree / Excellent
The number of accidents and injuries at work has been significantly reduced by the safety controls implemented.	3.34	Strongly Agree / Excellent

The safety controls are adapted to changes in site conditions or project requirements in a timely manner.	3.53	Strongly Agree / Excellent
The safety controls implemented at our site effectively mitigate potential hazards.	3.24	Agree / Good
Overall Weighted Mean	**3.39**	**Strongly Agree / Excellent**

Moreover, Table 3 shows the perceptions of the respondents with regards to their implementation of safety controls for different construction projects in the public sector. The results indicated that the respondents have an excellent rating when it comes to reviewing and updating safety controls on a regular basis, promoting safety protocols on site, reducing accidents and injuries, and implementing safety controls that are flexible to the project requirements. On the other hand, they rated the implementation of safety controls as effectively mitigating their potential hazards with a good rating.

Overall, the implementation of Safety Controls of different construction projects of public sectors is Excellent at 3.39 rating.

F. Safety Management: Training on Safety (Public

TABLE IV
SAFETY MANAGEMENT: TRAINING ON SAFETY (PUBLIC)

Indicators	Weighted Mean	Interpretation
The regular safety training programs, like OSHA construction training, provided are relevant to the hazards present at our worksite.	3.39	Strongly Agree / Excellent
The materials that are provided in our training for safety are helpful and applicable to the daily tasks.	3.27	Strongly Agree / Excellent
Regular safety training programs take account our common and specific safety concerns that are important to our work.	3.18	Agree / Good
The frequency of safety training sessions is sufficient to keep us updated on the latest safety protocols and procedures.	3.23	Agree / Good
I am aware that regular safety training has contributed to a safer work environment on our site.	3.55	Strongly Agree / Excellent
Overall Weighted Mean	**3.32**	**Strongly Agree / Excellent**

Table 4 shows the perceptions of the respondents with regards to their safety training. The results indicated that the respondents were aware that regular safety training has contributed to a much safer work environment on site. It is rated Excellent, and the factor Training on Safety has an overall rating of 3.32.

G. Safety Management: Implementation of Communication and Signage (Public)

TABLE V
SAFETYMANAGEMENT: IMPLEMENTATION OF COMMUNICATION AND SIGNAGE (PUBLIC)

Indicators	Weighted Mean	Interpretation
Safety signage is clearly visible; and strategically placed throughout the site.	3.47	Strongly Agree / Excellent
Management actively supports and promotes the importance of clear communication and signage for safety.	3.38	Strongly Agree / Excellent
The implementation of communication and signage has reduced the likelihood of accidents and near misses.	3.30	Strongly Agree / Excellent
There is clear communication about the findings and recommendations.	3.13	Agree / Good
Safety instructions communicated through signage are clear and easy to understand.	3.53	Strongly Agree / Excellent
Overall Weighted Mean	**3.36**	**Strongly Agree / Excellent**

As shown in Table 5, the researchers determined the perceptions of the respondents in terms of the implementation of communication and signages of the public sector. The results indicated that the safety instructions on site are clear and easy to understand with the use of signages, at 3.53. The respondents also stated that signs were placed all over the site, entry and exit points.

Overall, the Safety Management: Implementation of Communication and Signage of construction projects of public sectors is Excellent.

H. Safety Management: Use of Personal Protective Equipment (PPE) (Public)

TABLE VI
SAFETY MANAGEMENT: USE OF PERSONAL PROTECTIVE EQUIPMENT (PPE) (PUBLIC)

Indicators	Weighted Mean	Interpretation
I am aware that it is essential when working onsite to wear appropriate protective equipment in order to ensure a safe working environment.	3.93	Strongly Agree / Excellent
The organization is actively promoting, through training and signage, a culture that promotes the use of PPE in all its activities.	3.45	Strongly Agree / Excellent
I observe that my colleagues are committed to the constant use of appropriate protection equipment.	3.35	Strongly Agree / Excellent
I understand the importance of using the appropriate protective equipment to ensure my own safety at work.	3.91	Strongly Agree / Excellent
The organization is actively ensuring the usefulness and effectiveness of the protective equipment provided.	3.41	Strongly Agree / Excellent
Overall Weighted Mean	**3.61**	**Strongly Agree / Excellent**

On the other hand, table 6 shows the perception of the respondents with regards to the use of Personal Protective Equipment (PPE) on construction sites having a rate of 3.61. The highest rating is given on the factor that the respondents are aware that it is essential to wear the appropriate PPE on site to ensure a working environment.

Overall, the implementation of using of Personal Protective Equipment (PPE) of construction projects of public sectors is Excellent.

I. Safety Management: Conduct Risk Assessments and Hazard Inspections (Private)

TABLE VII
SAFETY MANAGEMENT: CONDUCT RISK ASSESSMENTS AND HAZARD INSPECTIONS (PRIVATE)

Indicators	Weighted Mean	Interpretation
I observe that the risk assessment process is thorough and covers all relevant aspects of the work environment.	3.03	Agree / Good
I prioritize the implementation of safety measures identified in risk assessments.	3.60	Strongly Agree / Excellent
I follow a regular tool box meeting and tool box inspection on our work site to address and mitigate identified hazards.	3.33	Strongly Agree / Excellent
I feel confident in my ability to identify potential hazards during site inspections.	3.25	Agree / Good
I frequently anticipate hazards to appropriately maintain a safe work environment.	3.31	Strongly Agree / Excellent
Overall Weighted Mean	**3.30**	**Strongly Agree / Excellent**

Table 7 shows that the researchers determined the perceptions of the respondents in terms of conducting risk assessments and hazard inspections of different construction projects in the private sector. The overall weighted mean of 3.30 indicates an interpretation of strongly agree or excellent in safety management practices. With the lowest mean score of 3.03, respondents generally agree that the risk assessment process is thorough. Prioritizing safety measures receives the highest mean score of 3.60. Respondents also express confidence in identifying potential hazards during inspections and actively anticipate hazards to maintain a safe work environment.

Overall, Safety Management: Conducting Risk Assessments and Hazard Inspections of Construction Projects for the Private Sector is Excellent.

J. Safety Management: Implementation of Safety Controls (Private)

TABLE VIII
SAFETY MANAGEMENT: IMPLEMENTATION OF SAFETY CONTROLS (PRIVATE)

Indicators	Weighted Mean	Interpretation
In order to address emerging risks or changes in legislation, safety controls shall be reviewed and updated on a regular basis.	3.60	Strongly Agree / Excellent
I am aware that all workers are actively involved in the promotion and observance of safety protocols on site.	3.25	Agree / Good
The number of accidents and injuries at work has been significantly reduced by the safety controls implemented.	3.31	Strongly Agree / Excellent
The safety controls are adapted to changes in site conditions or project requirements in a timely manner.	3.70	Strongly Agree / Excellent
The safety controls implemented at our site effectively mitigate potential hazards.	3.24	Agree / Good

Overall Weighted Mean	**3.42**	**Strongly Agree / Excellent**

Table 8 presents the perceptions of the respondents regarding the implementation of safety controls in different construction projects in the private sector. Safety controls that are quickly adapted when things change in site conditions or project requirements have the highest rating while safety controls implemented to effectively mitigate potential hazards have the lowest mean.

Overall, the Safety Management: Implementation of Safety Controls of construction projects for private sectors is Excellent at a 3.42 rating.

K. Safety Management: Training on Safety (Private)

TABLE IX
SAFETY MANAGEMENT: TRAINING ON SAFETY (PRIVATE)

Indicators	Weighted Mean	Interpretation
The regular safety training programs, like OSHA construction training, provided are relevant to the hazards present at our worksite.	3.60	Strongly Agree / Excellent
The materials that are provided in our training for safety are helpful and applicable to the daily tasks.	3.53	Strongly Agree / Excellent
Regular safety training programs take account our common and specific safety concerns that are important to our work.	3.27	Strongly Agree / Excellent
The frequency of safety training sessions is sufficient to keep us updated on the latest safety protocols and procedures.	3.36	Strongly Agree / Excellent
I am aware that regular safety training has contributed to a safer work environment on our site.	3.61	Strongly Agree / Excellent
Overall Weighted Mean	**3.47**	**Strongly Agree / Excellent**

As shown in Table 9, The highest rating pertains to respondents being aware that regular safety training has contributed to a safer work environment on-site with a score of 3.61. The lowest rating is for regular safety training programs taking into account the common and specific safety concerns that are important to work scoring 3.27.

Overall, the weighted mean is 3.47, indicating an excellent perception of the effectiveness of safety training programs in safety management.

L. Safety Management: Implementation of Communication and Signage (Private)

TABLE X
SAFETYMANAGEMENT: IMPLEMENTATION OF COMMUNICATION AND SIGNAGE (PRIVATE)

Indicators	Weighted Mean	Interpretation
Safety signage is clearly visible; and strategically placed throughout the site.	3.48	Strongly Agree / Excellent
Management actively supports and promotes the importance of clear communication and signage for safety.	3.32	Strongly Agree / Excellent
The implementation of communication and signage has reduced the likelihood of accidents and near misses.	3.44	Strongly Agree / Excellent
There is clear communication about the findings and recommendations.	3.13	Agree / Good
Safety instructions communicated through signage are clear and easy to understand.	3.39	Strongly Agree / Excellent
Overall Weighted Mean	**3.35**	**Strongly Agree / Excellent**

The highest-rated factor is the visibility and strategic placement of safety signage throughout the site, while the lowest-rated factor is the clarity of communication regarding findings and recommendations.

Overall, respondents strongly agree on the effectiveness of safety communication and signage in reducing accidents and promoting safety, with a weighted mean score reflecting the excellence of construction projects for the private sector.

M. Safety Management: Use of Personal Protective Equipment (PPE) (Private)

TABLE XI
SAFETY MANAGEMENT: USE OF PERSONAL PROTECTIVE EQUIPMENT (PPE) (PRIVATE)

Indicators	Weighted Mean	Interpretation

I am aware that it is essential when working onsite to wear appropriate protective equipment in order to ensure a safe working environment.	4.00	Strongly Agree / Excellent
The organization is actively promoting, through training and signage, a culture that promotes the use of PPE in all its activities.	3.70	Strongly Agree / Excellent
I observe that my colleagues are committed to the constant use of appropriate protection equipment.	3.31	Strongly Agree / Excellent
I understand the importance of using the appropriate protective equipment to ensure my own safety at work.	4.00	Strongly Agree / Excellent
The organization is actively ensuring the usefulness and effectiveness of the protective equipment provided.	3.80	Strongly Agree / Excellent
Overall Weighted Mean	**3.76**	**Strongly Agree / Excellent**

The highest-rated factors pertain to the importance of wearing appropriate protective equipment to ensure a safe working environment and the respondents' awareness regarding the essentiality of wearing PPE on site. The lowest-rated aspect is observing colleagues' commitment to the constant use of protective equipment.

Overall, the respondents strongly agree on the importance and effectiveness of promoting and using protective equipment, with a weighted mean score of 3.76, indicating an excellent perception of safety measures of construction projects for the private sector.

N. Analysis and Interpretation of the Overall Ranking of Factors/Practices

TABLE XII
TOP 5 RANKED FACTORS/PRACTICES OF PUBLIC SECTORS

Factors/Practices	Overall Weighted Mean	Rank	Result
Use of Personal Protective Equipment (PPE)	3.61	1	Excellent
Implementation of Safety Controls	3.39	2	Excellent
Implementation of Communication and Signage	3.36	3	Excellent
Training on Safety	3.32	4	Excellent
Conduct Risk Assessments and Hazard Inspections	3.30	5	Excellent

This analysis pertains to the ranking of various practices of the safety management of public sectors based on their weighted means. The Use of PPE is ranked first, Implementation of Safety Controls as the second, third is the Implementation of Communication and Signage, followed by Training on Safety, and lastly, Conducting Risk Assessments and Hazard Inspections.

Overall, all factors resulted in "Excellent," which indicates the effectiveness and positive perceptions of respondents regarding safety practices in safety management.

TABLE XIII
TOP 5 RANKED FACTORS/PRACTICES OF PRIVATE SECTORS

Factors/Practices	Overall Weighted Mean	Rank	Result
Use of Personal Protective Equipment (PPE)	3.76	1	Excellent
Training on Safety	3.47	2	Excellent
Implementation of Safety Controls	3.42	3	Excellent
Implementation of Communication and Signage	3.35	4	Excellent
Conduct Risk Assessments and Hazard Inspections	3.30	5	Excellent

This analysis pertains to the ranking of various practices of the safety management of private sectors based on their weighted means. The Use of PPE is ranked first, Training on Safety as the second, third is the Implementation of Safety Controls, followed by Implementation of Communication and Signage, and lastly, Conducting Risk Assessments and Hazard Inspections.

Overall, all factors resulted in "Excellent," which indicates the effectiveness and positive perceptions of respondents regarding safety practices in safety management.

V. CONCLUSIONS

Safety management is important not only for the well-being of the workers but also for ensuring that projects run smoothly. These involve the use of

PPE, proper training, implementation of communication and signage, and conducting risk assessment and hazard inspections. These practices or safety protocols help in preventing accidents that might happen in workplaces. Construction firms that prioritize safety at every construction project can create a safe working environment that protects workers and promotes project success. Ultimately, the results from the questionnaire identify and emphasize evaluating safety management techniques along a range of dimensions to ascertain how these practices are perceived and how successful they are at providing a safe working environment for construction projects. The current study identifies and analyzes the different practices under safety management. The statistical analysis of both the public and private sectors resulted in significant conclusions about the efficacy of safety management. Conducting risk assessments, implementing safety controls, providing safety training, implementing communication and signs, and using personal protective equipment (PPE) were all reviewed.

Both the government and private sector emphasize safety management within workplaces that provides data into which factors are considered best practices. Based on their weighted mean, the researchers were able to identify the effectiveness and prioritization of best practices. Both sectors hold the use of Personal Protective Equipment (PPE) as the highest-rated factor indicating the importance of it in working under construction firms. On the other hand, conducting risk assessments and hazard inspections is the lowest-rated factor of both sectors, which indicates that this area still needs improvement. Overall, these findings provide insights into the importance of safety management practices in both sectors to future researchers and other organizations regarding the optimization of their safety protocols.

This research underlines the importance of best practices and risk assessment in maintaining safe working places, especially in construction. This also highlights the need for proactive measures, such as thorough planning and safety protocols, to reduce injuries and accidents in the workplace. This study gives knowledge to future researchers and other organizations to improve and use what they have learned in future projects. Additionally, it pertains to how important the role of engineers and safety officers in keeping construction sites safe. They are aware of the potential dangers, and they make sure everyone follows the safety measures. The results serve as a basis for future researchers emphasizing the importance of ongoing improvement in safety standards to protect workers and engineering representatives, as well as to enhance the overall project efficacy.

ACKNOWLEDGMENT

Without the guidance and assistance of several individuals who, in one way or another, have contributed to its preparation and completion, it would be impossible to carry out such a study. The researchers would like to express their profound gratitude and appreciation to the following individuals:

Firstly, we, the proponents, would like to express our sincere thanks to our research coordinator, Engr. Carl Jason A. Coronel for giving us the right corrections in our paper and for brilliantly and patiently offering us support, advice, suggestions, and valuable comments in the fulfilment and success of this marketing plan, especially for believing that we could finish this study.

We would also like to offer our special thanks to Engr. Ericka Rose C. Guinto, our research adviser, understands, encourages, and also helps us in completing this paper. We deeply appreciate all the participants in this research study for giving us their whole cooperation by providing us with the appropriate information that was asked in the survey questionnaires.

We would also like to thank our family, friends, classmates, and all those who have supported and guided us in everything we do.

Finally, the proponents would like to thank our Almighty God for his constant love and strength that he has given us during this research study.

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