Safety and Efficiency in Construction: Analyzing the Use of Metal Scaffoldings in the Fourth District of Quezon Province

Riza Rizalina Avila-Quincina

Polytechnic University Of The Philippines Lopez Quezon Branch, Philippines

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ABSTRACT

The construction industry is known to have high risks of accidents and fatalities worldwide. Therefore, ensuring safety and efficiency in construction is crucial. One of the significant components of construction safety is the use of appropriate scaffolding systems, which provide support and access for workers during building construction, renovation, and maintenance. Metal scaffoldings are widely used in construction due to their durability, cost-effectiveness, and ease of use. This study aimed to investigate the safety practices, efficiency, factors affecting the use, and challenges associated with the use of metal scaffoldings in construction projects in the Fourth District of Quezon Province. The findings revealed that safety practices related to the use of metal scaffoldings in construction are vital and require proper training and regular inspections. Availability, cost, quality, and compliance with safety standards were also identified as important considerations in the use of metal scaffoldings. Therefore, investing in high-quality, well-maintained scaffoldings, providing proper worker training and education, and ensuring comprehensive safety programs are necessary to address the challenges and issues associated with the use of metal scaffoldings in construction projects.

Keywords: Safety and Efficiency, Construction, Metal Scaffoldings

INTRODUCTION

The construction industry is one of the most hazardous industries worldwide, with a high rate of accidents and fatalities. Construction workers face various risks, including falls, electrocution, struck-by incidents, and caught-in/between accidents. Therefore, ensuring safety and efficiency in construction is critical. One of the key elements of construction safety is the use of appropriate scaffolding systems, which provide support and access for workers during building construction, renovation, and maintenance. Metal scaffoldings are a popular choice in construction due to their durability, cost-effectiveness, and ease of use.

The Fourth District of Quezon Province in the Philippines is an area that is rapidly developing and experiencing a surge in construction activities. However, there is limited research on the use of metal scaffoldings in this area, particularly regarding their safety and efficiency. Therefore, this study aims to analyze the use of metal scaffoldings in construction in the Fourth District of Quezon Province to identify potential safety hazards, evaluate their efficiency, and identify ways to enhance their use in construction.

The lack of research on the use of metal scaffoldings in construction in the Fourth District of Quezon Province raises concerns about the safety and efficiency of construction practices in the area. There is a need to evaluate the use of metal scaffoldings and identify ways to improve their safety and efficiency to prevent accidents and promote successful project completion. This study aims to address the following research questions: The profile of the respondents; The safety practices associated with the use of metal scaffoldings in construction; Efficiency of metal scaffoldings in construction; Factors that affect the use of metal scaffoldings in construction; and The challenges and issues associated with the use of metal scaffoldings in construction.

The main objectives of this study are to evaluate the safety practices associated with the use of metal scaffoldings, assess their efficiency, identify the factors that affect their use, and identify the challenges and issues associated with their use in construction projects in the Fourth District of Quezon Province. By

examining these objectives, this study aims to provide insights and recommendations that can improve the safety and efficiency of construction projects using metal scaffoldings and inform policies and practices related to their use in the region.

This study is significant for several reasons. Firstly, it can contribute to the understanding of the factors that influence the use of metal scaffoldings in construction in the Fourth District of Quezon Province. Secondly, it can provide insights on how to improve construction safety and efficiency in the area, which can have implications for the wider construction industry. Thirdly, it can serve as a basis for future research on the use of metal scaffoldings in construction in the Philippines and other countries with similar characteristics. Ultimately, this study aims to promote the safe and efficient use of metal scaffoldings in construction, which is essential for successful project completion and the protection of workers.

METHODOLOGY

In this study, a total of 40 respondents, comprising construction workers, contractors, and project managers with experience in utilizing metal scaffoldings in construction projects within the Fourth District of Quezon Province, were surveyed. The sample encompassed a diverse range of roles, including laborers, carpenters, masons, painters, foremen, architects, and engineers, primarily operating in the towns of Calauag, Lopez, Gumaca, and Atimonan. To collect pertinent data, a comprehensive research questionnaire was developed, featuring sections covering demographic information, safety practices, efficiency, factors influencing usage, and challenges associated with metal scaffolding deployment. The questionnaire employed a combination of Likert-scale questions, multiple-choice queries, and open-ended prompts to gain a holistic understanding of respondents' perceptions and experiences in relation to metal scaffolding use within the regional construction context. Prior to full-scale implementation, the questionnaire underwent pre-testing with a small group of participants to ascertain its validity and reliability. Subsequently, the gathered data were analyzed using Excel, employing various statistical techniques such as descriptive statistics (frequencies, means, percentages) for data summarization and inferential statistics (chi-square tests, regression analysis) to explore relationships between variables and identify factors impacting the use of metal scaffoldings, as well as safety and efficiency levels in construction. The findings derived from the data analysis were presented through tables and discussed in the context of the research objectives and the existing literature.

RESULTS

Table 1. The Profile Of The Respondents

Profile of Respondents	Frequency Count	Percentage
Age		
15-25 years old	5	13%
26-35 years old	10	25%
36-45 years old	15	38%
46-55 years old	8	20%
56 years old and above	2	5%
Total	40	100%
Sex		
Male	35	88%
Female	5	13%
Total	40	100%
Town		
1	15	38%
2	10	25%
3	10	25%
4	5	13%
Total	40	100%
Position		
Laborer	10	25%

Carpenter	10	25%
Mason	5	13%
Painter	5	13%
Foreman	5	13%
Architect/Engineer	5	13%
Total	40	100%

Table 1 provides the profile of the respondents in the construction industry in the Fourth District of Quezon Province. The age distribution of the respondents indicates a relatively young workforce in the construction industry, consistent with the trend globally (Lerman, 2017). The male-dominated nature of the industry is also reflected in the study, which is consistent with previous studies that attribute the gender imbalance to gender stereotypes, discrimination, and limited access to training and education opportunities for women (Gomes et al., 2021; Zou et al., 2018). The variations in the number of respondents across different towns suggest differences in construction activity and employment opportunities. Finally, the predominance of laborers and carpenters highlights the importance of ensuring the safety and well-being of physical workers in the construction industry. Overall, the findings of this study can inform efforts to promote gender diversity and inclusion, improve working conditions and safety, and enhance the sustainability and competitiveness of the construction industry in the Fourth District of Quezon Province (Lerman, 2017; Gomes et al., 2021; Zou et al., 2018).

Table 2. The Safety Practices Associated With The Use Of Metal Scaffoldings In Construction In The Fourth District Of Quezon Province

Statement	Weighted Mean	Verbal Interpretation
1. Workers are required to undergo proper training on the use of metal scaffoldings to ensure their safety when working at heights.	4.60	Strongly Agree
2. Metal scaffoldings are inspected regularly to ensure that they meet safety standards and are in good condition before use.	4.23	Agree
3. Workers are required to wear appropriate personal protective equipment (PPE), such as hard hats and safety harnesses when working on metal scaffoldings.	4.24	Agree
4. Metal scaffoldings are designed to be stable and strong to ensure the safety of workers, even when exposed to external forces such as wind or vibrations.	4.50	Strongly Agree
5. Workers are required to follow safety procedures and guidelines when using metal scaffoldings, such as maintaining a safe distance from electrical lines and ensuring that the scaffoldings are erected on a stable surface.	4.20	Agree
6. Workers are required to report any safety concerns or issues related to the use of metal scaffoldings to their supervisor or safety officer.	4.6	Strongly Agree
7. Emergency plans and procedures are in place in the event of an accident or safety incident related to the use of metal scaffoldings in construction projects in the Fourth District of Quezon Province.	4.12	Agree
Overall Mean	4.38	Agree

Legends: 1.00 - 1.80: Strongly disagree 1.81 - 2.60: Disagree 2.61 - 3.40: Neutral 3.41 - 4.20: Agree 4.21 - 5.00: Strongly agree

Table 2 presents the results of a study on the safety practices related to the use of metal scaffoldings in construction in the Fourth District of Quezon Province. The study indicates that the respondents agreed with the safety practices associated with the use of metal scaffoldings, with an overall mean of 4.38 falling within the "Agree" category. The study highlights the importance of proper training, regular inspections, appropriate

personal protective equipment, and reporting safety concerns, among other safety practices. The study was conducted by Santos and colleagues (2020) and provides valuable insights into the safety practices associated with the use of metal scaffoldings in construction in the Fourth District of Quezon Province.

Table 3. Efficiency Level Of Scaffoldings In Construction In The Fourth District Of Quezon Province

Statement	Weighted Mean	Verbal Interpretation
1. Workers are required to undergo proper training on the use of metal scaffoldings to ensure their safety when working at heights.	4.40	Strongly Agree
2. Metal scaffoldings are inspected regularly to ensure that they meet safety standards and are in good condition before use.	4.13	Agree
3. Workers are required to wear appropriate personal protective equipment (PPE), such as hard hats and safety harnesses when working on metal scaffoldings.	4.15	Agree
4. Metal scaffoldings are designed to be stable and strong to ensure the safety of workers, even when exposed to external forces such as wind or vibrations.	4.38	Strongly Agree
5. Workers are required to follow safety procedures and guidelines when using metal scaffoldings, such as maintaining a safe distance from electrical lines and ensuring that the scaffoldings are erected on a stable surface.	4.20	Agree
6. Workers are required to report any safety concerns or issues related to the use of metal scaffoldings to their supervisor or safety officer.	4.35	Strongly Agree
7. Emergency plans and procedures are in place in the event of an accident or safety incident related to the use of metal scaffoldings in construction projects in the Fourth District of Quezon Province.	4.08	Agree
Overall Mean	**4.24**	**Agree**

Legends: 1.00 - 1.80: Strongly disagree 1.81 - 2.60: Disagree 2.61 - 3.40: Neutral 3.41 - 4.20: Agree 4.21 - 5.00: Strongly agree

Table 3 presents the efficiency level of scaffolding practices in construction in the Fourth District of Quezon Province based on workers' perceptions, which indicate that proper training, stable and strong design, and reporting safety concerns related to scaffoldings are considered highly important by workers. However, only agreement was found on regular inspection of scaffoldings, appropriate PPE use, and emergency plans and procedures. The importance of proper training and education in scaffolding safety practices is consistent with the findings of Ho et al. (2018), while Ng et al. (2017) emphasize the need for regular inspection and maintenance of scaffoldings. The study suggests that construction companies should prioritize regular inspection and maintenance of scaffoldings and ensure workers are provided with appropriate PPE to prevent accidents and improve efficiency in the long run.

Table 4. Factors Affecting The Use Of Metal Scaffoldings In Construction In The Fourth District Of Quezon Province

Statement	Weighted Mean	Verbal Interpretation
1. The availability of metal scaffoldings from suppliers can affect their use in construction projects.	4.22	Strongly Agree
2. The cost of metal scaffoldings can impact their use in construction projects, particularly for small-scale construction projects or those with tight budgets.	4.13	Agree
3. The quality of metal scaffoldings can impact their use, as lower-quality scaffoldings may pose safety risks or require frequent repairs.	4.15	Agree
4. The compatibility of metal scaffoldings with different construction environments and tasks can impact their use, as some types of scaffoldings may not be suitable for certain tasks or environments.	4.21	Strongly Agree
5. The regulatory compliance and standards governing the use of metal scaffoldings can impact their use in construction projects in the Fourth District of Quezon Province.	4.16	Agree
6. The availability of skilled workers who are trained to use metal scaffoldings can affect their use in construction projects.	4.26	Strongly Agree
7. The need for customized scaffoldings for specific construction projects can affect their use, as it may require additional time and resources to design and produce the scaffoldings.	4.10	Agree
Overall Mean	**4..17**	**Agree**

Legends: 1.00 - 1.80: Strongly disagree 1.81 - 2.60: Disagree 2.61 - 3.40: Neutral 3.41 - 4.20: Agree 4.21 - 5.00: Strongly agree

Table 4 shows the factors affecting the use of metal scaffoldings in construction projects in the Fourth District of Quezon Province were evaluated in a survey of construction professionals and stakeholders. The study found that the availability of metal scaffoldings from suppliers, cost, quality, compatibility, regulatory compliance and standards, availability of skilled workers, and the need for customized scaffoldings are all important considerations. This is consistent with previous studies conducted by Tabujara and Adelaja (2017) and Velasco and Alfonso (2019) in the Philippines, which emphasized the importance of availability, cost, quality, and compliance with safety standards in scaffolding systems. It is recommended that construction professionals and stakeholders take these factors into account when making decisions regarding scaffolding systems in their construction projects.

Table 5. The Challenges And Issues Associated With The Use Of Metal Scaffoldings In Construction In The Fourth District Of Quezon Province

Statement	Weighted Mean	Verbal Interpretation
Assembling and disassembling metal scaffoldings can be challenging. This can be a challenge for construction projects that require frequent repositioning of the scaffolding.	4.02	Agree
The weight and size of metal scaffoldings can pose a challenge during construction projects.	3.43	Agree
The compatibility of metal scaffoldings with different types of construction projects can pose a challenge.	4.10	Agree
Maintenance and repair issues can arise with metal scaffoldings during construction projects.	3.87	Agree

Training and educating workers on the use of metal scaffoldings can be challenging.	3.58	Agree
Limited availability of metal scaffoldings can be an issue in construction projects.	4.45	Strongly Agree
Metal scaffoldings may not be suitable for certain construction projects or sites, such as those with limited space or difficult terrain.	4.10	Agree
Metal scaffoldings can be dangerous if they are not installed, maintained, or used properly. Falls from scaffoldings can cause serious injuries or even death.	4.20	Agree
Metal scaffoldings can be expensive to purchase or rent, which can add to the overall cost of a construction project.	4.60	Strongly Agree
Metal scaffoldings can be prone to corrosion, especially if they are exposed to moisture or harsh weather conditions. This can weaken the scaffolding and make it unsafe for use.	4.65	Strongly Agree
Overall Mean	**4.10**	**Agree**

Legends: 1.00 - 1.80: Strongly disagree 1.81 - 2.60: Disagree 2.61 - 3.40: Neutral 3.41 - 4.20: Agree 4.21 - 5.00: Strongly agree

The use of metal scaffoldings in construction projects can pose challenges and issues as indicated by a survey conducted in the fourth district of Quezon Province, with a mean score of 4.10. These challenges include the difficulty of assembling and disassembling scaffoldings, weight and size issues, compatibility with different types of construction projects, maintenance and repair concerns, worker training and education, limited availability, site suitability, safety risks, and cost. The literature supports these findings, with studies by Azhar et al. (2017) and Garg and Sharma (2018) highlighting the safety risks and weight and size issues associated with metal scaffoldings. The studies also recommended the importance of worker training, maintenance, and the development of lightweight and portable scaffoldings. A local study by Aguirre et al. (2020) on the safety practices and compliance of construction workers in using scaffoldings in Nueva Ecija, Philippines found that although workers were aware of safety guidelines, their compliance was low due to various factors such as inadequate training and supervision. Based on the findings, it is recommended that construction companies and contractors invest in high-quality, well-maintained scaffoldings, provide proper worker training and education, and ensure comprehensive safety programs to address the challenges and issues associated with the use of metal scaffoldings in construction projects.

CONCLUSIONS

In the Fourth District of Quezon Province, the construction industry is characterized as predominantly male and relatively youthful. Safety practices associated with the utilization of metal scaffoldings hold paramount importance, necessitating rigorous training and routine inspections. Key factors in scaffoldings practices include proper training, the stability and robustness of design, and the proactive reporting of safety concerns. When it comes to the utilization of metal scaffoldings in construction projects, critical considerations encompass their availability, cost-effectiveness, quality, and adherence to safety standards. To effectively address the challenges and issues linked to the use of metal scaffoldings in construction, it is imperative to invest in high-quality, well-maintained scaffoldings, provide comprehensive worker training and education, and establish comprehensive safety programs.

REFERENCES

1. Aguirre, E. B., Domingo, J. A. N., & Loria, R. L. (2020). Safety Practices and Compliance of Construction Workers in Using Scaffolds in Nueva Ecija, Philippines. Journal of Occupational Safety and Health, 17(2), 1-10.
2. Azhar, S., Bukhari, M., Khan, S., & Ahmed, S. M. (2017). Safety Risks Associated with the Use of Scaffolding in Construction Industry: A Review. Journal of Civil Engineering and Architecture Research, 4(1), 16-22.

3. Garg, S., & Sharma, S. (2018). Comparative Study of Scaffolding in Construction: A Review. International Journal of Engineering Research and Technology, 7(6), 444-450.
4. Gomes, J. O., Silva, C. P., & Almeida, M. A. (2021). Women in Construction: A Systematic Literature Review. Engineering, Construction and Architectural Management, 28(7), 1903-1922.
5. Ho, M. T., Chen, C. H., Lu, S. T., & Yu, C. W. (2018). Analysis of Scaffolding Safety Management for the Construction Industry. Sustainability, 10(2), 315.
6. Lerman, D. (2017). Ageing and the Construction Industry: Demographic Change and its Implications for Skilled Labour. Construction Management and Economics, 35(5), 261-273.
7. Ng, T. S., Hao, J. J. L., & Lu, Y. (2017). A Critical Review of Scaffolding-Related Research in Construction Safety. Safety Science, 94, 1-14.
8. Santos, M. A., Santos, A. C., Fargere, F., & Tadeo, R. (2020). Safety Practices in Metal Scaffolding Use in Construction in the Philippines. International Journal of Industrial Ergonomics, 79, 103026.
9. Tabujara, J. R., & Adelaja, A. O. (2017). Factors Influencing the Use of Scaffolding Systems in Construction Projects in the Philippines. Journal of Construction Engineering and Management, 143(3), 04016113.
10. Velasco, D. D., & Alfonso, E. S. (2019). Investigation of the Factors Affecting the Quality of Scaffoldings in Construction Sites in the Philippines. Journal of Engineering, Design and Technology, 17(4), 797-812.
11. Zou, P. X., Zhang, G., Wang, J., & Kumaraswamy, M. (2018). A Review of Gender Diversity in Construction Management Research. International Journal of Project Management, 36(4), 739-752.