EasyChair Preprint

№ 5065

Guidelines of Mid-rise Building Construction Works on Project Quality and Employees' Productivity Amidst Pandemic Period

Reynaldo Romel Castelo, Mel Janine Delos Santos and Paul Jonas Ruadap

February 27, 2021

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R. R.R. Castelo, M. J. R. Delos Santos, P.J.P. Ruadap

School of Civil, Environmental, and Geological Engineering,
Mapua University, Muralla St.,Intramuros, Manila, 1002 Philippines

rey_castelo24@gmail.com

meljaninerds@gmail.com

pjruadap@yahoo.com

Corresponding author E-mail: glcueto@mapua.edu.ph; geoffery_cueto@yahoo.com

Abstract

Various protocols and guidelines have been issued for construction work across the Philippines, most of such are implemented impetuously due to the sudden and unplanned events of the pandemic. The purpose of the study is to evaluate the cognizance of mid-rise construction employees (both workers and engineers) towards construction work guidelines in construction sites and the effectiveness of these guidelines across Philippines during the pandemic. We conduct interviews of both workers and engineers to identify awareness towards the guidelines, likewise, measure the effectivity of guidelines through project quality and productivity of workers and engineers. The study will overlook on present construction work guidelines, the possible adjustments, and improvements of the work guidelines makes mid-rise construction sites operate efficiently and adheres to construction safety and health principles.

Keywords: *Occupational Safety and Health ; Pandemic; Productivity ; Mid-rise Construction*

I. Introduction

The execution of construction projects during an untimely event like pandemic crisis tends to weaken majority of work scopes within particularly the performance of workers and engineers which main source is their productivity, and project quality being executed on site. Researchers have analyzed possible solutions for the said phenomena, from modern construction methods to adaptation and adjustment approaches toward such events. Past methods or innovations have been created toward similar events, but with the inclusion of modernization, these innovations or methods are deemed to be a past due to the nature of construction industry being a continuous evolving industry. The modern take on adapting to these kinds of events matched with the improved older methods towards completing the construction project as the focus of the research.

Through this consideration, related studies from accredited resources are also considered to improve the knowledge towards the analysis of guiding principles which goal is to maintain construction work situations and strategies, and to attain further progression even during a pandemic period. Furthermore, pandemic season requires vast adjustments in terms of safety protocols such as strict compliance of wearing protective face shields and face masks and observing social and physical distancing which creates huge impact upon the workers' performances and workflow as a whole because of huge quantity of workforces within a construction site.

Statement of Problem

In the industry of construction, construction companies have their own different standards being set and followed. Standards, protocols, or guidelines could be a critical adjustment when they are being set upon a pandemic period. The main purpose of this study is to assess an awareness regarding the role construction work guidelines in construction area amidst pandemic crisis in the Philippines. This paper aims to provide the benefits of mid-rise building construction works principle and the improvement it can provide in terms of efficiency through project quality and productivity among the employees, both workers and engineers.

In order to fulfill the main objective of this study, it specifically aims:

a. To discuss mid-rise construction work sequence strategies to maintain work progress and accomplishments amidst pandemic period.

b. To determine the effectiveness of guidelines in stabilizing project quality and employees' productivity in mid-rise construction project.

c. To discuss the improvement on project quality and employees' productivity in conforming to construction work guidelines during pandemic period.

II. Methodology

The goal of this research is to enhance precise and useful guidelines to anticipate risk events and plan risk responses for immediate recovery to minimize business losses faced by the construction projects in Quezon City, Metro Manila due to the pandemic. This research was provable case study research which was based on field data. This research was based on the collection of both quantitative and qualitative data primarily from the essential informants or experts of the related field from the employees and prime contractors. Literature Review, Case Studies, Key Source Interview, and Surveys were done.

To collect enough data for creating guidelines we will have a four-part survey questionnaire prepared by the researchers. These questionnaires will be answered by Project Managers and Project Engineers employed to construction companies. The questionnaires will help the researchers develop concrete guidelines towards identifying the reasons and factors that hinder the pandemic implementation of the guidelines on construction companies. The questionnaire was divided into four (4) segments:
a) Respondent's Profile which was used in establishing the data of the respondents; b) Level of Awareness regarding construction site standard procedures, laws and regulations; c) Level of agreement of respondents working at mid-rise buildings during COVID-19 Pandemic Period; and d) Action plans to increase work productivity and project quality amidst pandemic period.
One part of the questionnaire would be to understand the company profile and the types of project it handles alongside profile of its employees, following with the next part which is to know the knowledge and understanding level of the personnel in charge of the project on the principles of pandemic. Third, to know that level of agreement of employees during their working phase while dealing with pandemic crisis. Lastly, part four of the survey defines the action plan to be taken in action with regards to difficulties that hinders construction industry's progression due to pandemic. This difficulty will be ranked from highest to lowest to know what are the most common difficulty that is encountered by the construction companies, the researchers tackled the detailed explanation and discussion of the plan of action the researchers carried out and the step-by-step process on how the researchers carried out the main objective of the research, which is to help mid-rise building as work starts after Enhance Community Quarantine is lifted and now starts the new normal. Sample Size a group of people chosen out of a large number and ask a series of questions to get full.

The study aims to examine the effectiveness of our proposed guidelines towards construction work of mid-rise structures during and after pandemics in the said setting. To be able to garner given

objectives, the researchers gather data through surveys and interviews that pertain towards the guidelines we crafted. The data gathered is to be analyzed and elucidated using statistical treatment. The statistical treatment that is to be utilized is t-test statistical treatment. In this treatment, it will dissect the issue of this investigation in three sections. The statistical treatment in the initial segment, it will distinguish that primary issue in this examination that should be unraveled. For the subsequent part, it will at that point recognize all the potential answers for the issue. Ultimately, it will distinguish how these arrangements will be assessed.

The setting of the research includes the employees and prime contractors of mid-rise construction project sites within Metro Manila, specifically in Quezon City, being the respondents of the provided surveys of the researchers. With this, the employees' data gathering includes a mixed-up bracket of on-site and office engineers.

The respondents of the study are the employees working in prime contractors of construction project sites located in Quezon City with 70 employees with the knowledge for this specific study. Additionally, these people are those who have been working in the field even before the pandemic occurred.

The procedures that the researchers conducted is to formulate appropriate risk responses for quick recovery about work stoppages due to the pandemic. The researchers presented a specific and precise arrangement of questions for the survey, to understand and analyze the information that will be used to formulate the guidelines. The employees, both on-site and office engineers, also the supervisors, will be the recipient of the survey that will be based on the anticipated risk events to select a suitable response for a timely recovery. The questionnaires of the poll depended on the ideas including standards about the pandemic, as well as the aspects that influence the workforce. The items were created over many proclamations that distinguish their insight for work recovery.

Fig.1 exhibits the conceptual framework of the research that is seen as the methodical steps towards achieving the said objectives

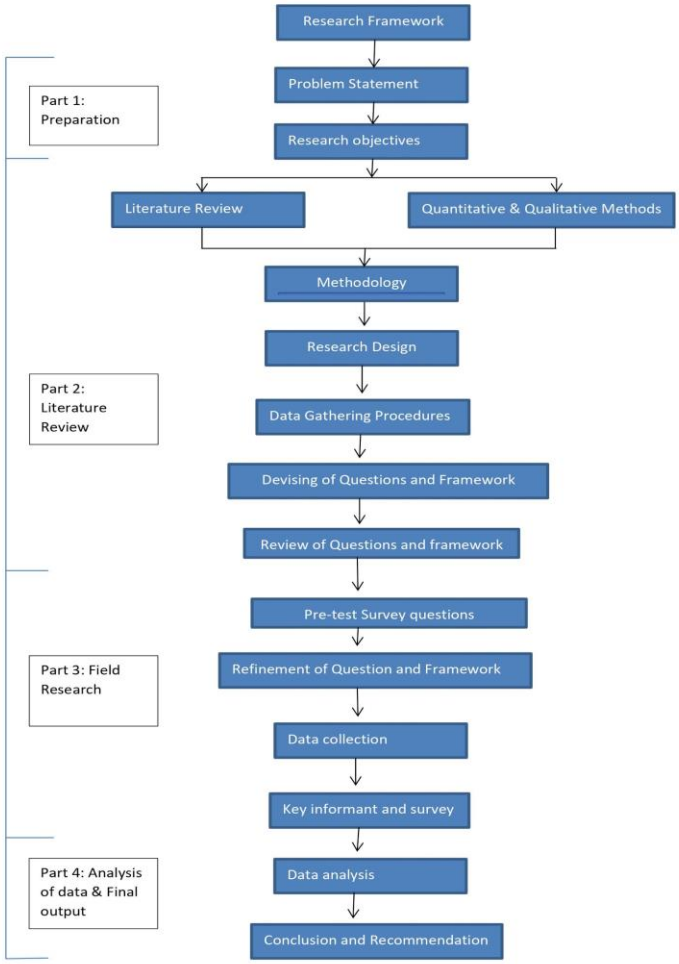

Figure 1. Conceptual Framework

This study begins with knowing that the pandemic that the nation is experiencing right now is affecting the progress of the construction fields due to the work stoppages. Formulating guidelines on how to recover from the lost time due to the pandemic will be going to be the focus of this study.

In finding possible solutions to recover, analyzing the threat is a possible way to develop cost effective way and guidelines making. The researcher will do two ways to come up data, one is to conduct an interview, two is a survey.

III. Result and Discussion

Demographic Profile

1. The first section of the questionnaire is the profile of the respondents in terms of age, gender, years of experience, current designation, and type of organization.
2. The second section of the questionnaire is the assessment on the level of awareness of the respondents working on mid-rise construction sites regarding on their respective project's standard procedures, laws, and regulations.
3. The third section of the questionnaire is the assessment on the level of agreement of the respondents to working on mid-rise construction sites during COVID-19 pandemic period.
4. The fourth section of the questionnaire is the determination of action plans in the construction site in correlation to increasing work productivity and project quality of employees amidst pandemic period.

T-Test as Test Analysis

$$t = \frac{m - \mu}{s/\sqrt{n}}$$

$$t = \frac{m - \mu}{s/\sqrt{n}}$$

Equation which is the T-test formula is used to determine the behavior of a sample using the mean of the population. Where **t** is the t-test value, **m** is the mean value**, μ** is the theoretical value, **s** is the standard deviation, and **n** is the set size. T-test value will verify if the created null hypothesis is accepted or rejected using the **- t stat critical two value-tail <t stat value < + t stat critical two-tail value**. Based on the sample size the t-test formula applied in the study is t-test: one sample the researchers used 70 people for the survey and applying confidence level of 95 percent giving a margin error of 0.05 it is the safest and acceptable margin of error to have an accurate data.

Presentation of Data

Survey

THE PROFILE OF THE RESPONDENTS IN TERMS OF AGE, GENDER, YEARS OF EXPERIENCE, DESIGNATION OF EMPLOYEES AND TYPE OF ORGANIZATION.

RESPONDENTS IN TERMS OF AGE

Age	Age of Respondents	Percentage Age of Respondents
20-30	32	46%
31-40	26	37%
41-50	8	11%
51-60	4	6%

Table 4.1 Age of Respondents

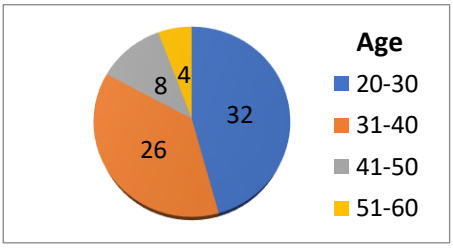

Figure 4.1 *Age of Respondents*

Table 4.1 and Figure 4.1 shows the tabulated and graph of the respondents in terms of age. Among 20-30 years of age are 32 which is 46% of the respondents; it is the biggest percentage of respondents, 31-40 years of age are 26 which is 37% the 2nd biggest percentage of respondents, while 41-50 years of age are 8 which is 11%, and 51-60 years of age are 4 which resulted to 6% which shows that there is a decrease in respondents due to age because of consideration of certain factors.

Considering the respondents output based on quantity, the highest bracket of age of construction site employees, both on-site and office engineers on the mid-rise field, is in the range of 20 to 30 years of age. This is the range wherein fresh graduates are being employed in the industry, also, this is considered as the most appropriate time to develop actual construction skills to gain experiences for better opportunities in the future. For the second biggest percentage from respondents which resulted to 31-40 years old, reflected to be the employees who have already had their long years of experiences. This range consist mostly of the lead field civil, mechanical, electrical engineers, and safety officers on site. For the third one, 41-50, most respondents belong here are those who are veteran in the site, they are the project-in-charge and supervisor/s who managed the whole project site from construction management preliminary to work actual enforcements. These designations are the most liable for the responsibility of the whole project together with the employees and workers even during before COVID-19 occurred. Project-in-charge and Area Managers both have the duties to strategize and to revise work sequence guidelines in terms when unexpected events happened, such as Pandemic Crisis.

RESPONDENTS IN TERMS OF GENDER

Gender	Respondents	Percentage of Respondents
Male	46	66 %
Female	24	34 %

Table 4.2 Gender of Respondents

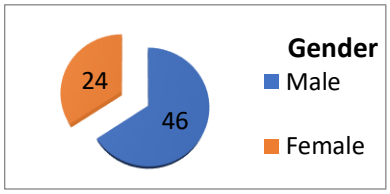

Figure 4.2 *Gender of Respondents*

Table 4.2 and Figure 4.2 Shows that there are 46 respondents for male covering 66% of population and 24 respondents for female having 34% both working in the office and field. Despite the increase in the number of women in the workplace in the late 20th and early 21st centuries, some careers are still predominantly male-oriented. Careers are male dominated for a variety of reasons, including history, cultural expectations and norms, stereotypes, job requirements and interest from prospective employees.

This is correlated based on the respondents in this study which contained an output from 70 respondents leaving female respondents to quantity of 24, male respondents to quantity of 46. Moreover, working in construction requires maximum strength which are mainly built up from years of experience may the employee be employees, supervisors, or even workers, and to be able to be assigned for works which require endurance when having walkthroughs, inspection, and straight-time concreting duties, etc. specifically fieldworks, an employee should withstand different levels of designation because both high-rise and mid-rise buildings

have their guidelines of rotating designation for all their engineers in order to experience all scope of construction works. Thus, contractors now are intended to look for both male and female construction employees reflecting equality for all kinds of industries and specialization.

RESPONDENTS IN TERMS YEARS OF EXPERIENCE

Years of Experience	Number of Respondents	Percentage of Respondents
0-5 yrs	42	60%
6-10 yrs	22	31%
16 and above	6	9%

Table 4.3 Respondents Years of Experience

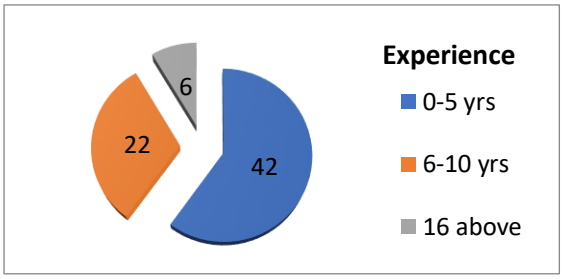

Figure 4.3 *Respondents Years of Experience*

The respondent years of experience is helpful in the researcher's data. Knowing that the respondent serves long years in the company knows more about the field process based on their designated work. Table 1.3 and Figure 1.3 shows that 42 have worked for 0-5 years, 22 worked for 6-10 years, and 6 who works for 16 years and above.

In construction field, workers stay if they are being taken care of, it is also the same thing for the employees; on-site engineers, office engineers, and even project supervisors, as well as if they are given assurance that all their works and safety PPEs or Personal Protective Equipment are complete and freely provided by the organization. Comes with all these is the benefits provided which should fall upon and reflected with company's working guidelines. Work guidelines on mid-rise buildings are settled right before 'new normal' happened but is strictly revised by the inclusion of COVID-19 protocols. Furthermore, having occupational safety and health assurance among workers are a big factor and consideration for them stay in the construction site. This is one of the reasons why the respondents are reflected to have the highest percentage for those workers who are already in their 6 to 10 years of working experience. Other bracket of years is not that high because workers are only amid their retirement considering their old age. In correlation to respondent's output regarding their respective years of experience, majority of employees working in construction sites are in the range of 0-5 years. Most people stay in their project sites just to gather actual field experiences and such, and after few years, they will resign. Nonetheless, people with experiences of 0-5 years tend to be the most aware and responsive when it comes to work construction guidelines on site. In accordance to OSHA COVID-19 guidance for the construction workforce which entails: encouraging workers to stay home if they are sick; advising workers to avoid physical contact from other job hazards and direct employees or contractors; to the extent tools or equipment to be shared, providing and instructing workers to use alcohol to clean tools before and after use, and many more. With these guidelines being strictly implemented, the role of all employees is to abide them to set as an example among workers from them to abide the protocols as well. It should be noted in the field of construction that not only a safety officer has the right to be strict towards workers, but also all employees, engineers in charge, both on-site and office engineers.

RESPONDENTS IN TERMS DESIGNATION

Current Designation	Number of Respondents	Percentage of Respondents
Project Supervisor	12	17%
Field Engineer	22	31%
Office Engineer	19	27%
Quality Control Engineer	17	24%

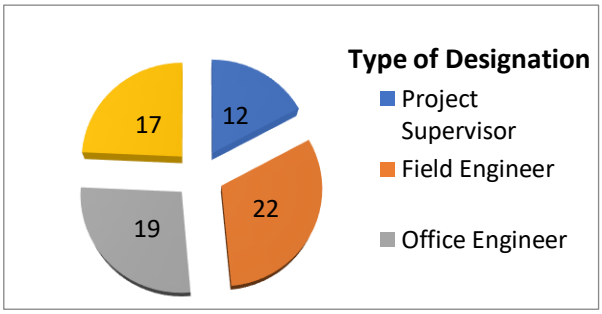

Table 4.4 Designation of Respondents

Figure 4.4 *Designation of Respondents*

Current Designation of Respondents are shown in Table 4.4 and Figure 4.4. Designation of respondents are categorized as project supervisor with 17% of respondents, field engineer composes of 31%, office engineer having 27%, and quality control engineer with 24%.

Construction consist of different scope of work, as well as level of designations upon engineers, safety, and administration works and/or offices. Respondents are mixed up with

designations such as Project Supervisors, Field Engineers, Office Engineers, and Quality Control Engineers. Also, having these respondents would make up a reliable and efficient data to be able to come up the level of awareness level of work guidelines, as well as abiding safety guidelines or protocols during the pandemic period, with regards to work related to mid-rise construction heights. Safety is not only a responsibility of those who are assigned in height works which are critical, but also other set of working scope. This is to ensure that every worker, most especially the engineers and supervisors, is aware of different protocols and safety and health regulations insisted by their certain companies alongside following the legislation supported by the main country laws as well.

RESPONDENTS IN TERMS TYPE OF ORGANIZATION

Type of Organization	Number of Respondents	Percentage of Respondents
Main Contractor	40	57%
Sub-Contractor	30	43%

Table 4.5 Respondents Type of Organization

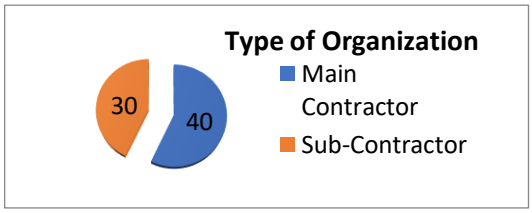

Figure 4.5 *Respondents Type of Organization*

There is different type of organization the researcher's considered. In table 4.5 and figure 4.5, 57% are main contractor, and 43% is sub-contractor.

General or Main Contractors have the highest amount or supply of labor, materials, and equipment in a specific construction project, which obviously reflected the highest number of respondents attained, given in the above table. Moreover, the next type or organization is the subcontractor, they are the ones who contributes to executing and delivering materials for different scope of works, from steel bars, masonry, down to finishing resources.

This are the companies which provide different level of specialty among their workers; one of the reasons why it is good for main contractors to be linked in or with subcontractors, all for the benefit of the project reaching its target scheduled timetable while still achieving quality works outputs.

Interview

The researchers conducted an interview through submission of document on different construction mid-rise project sites, which includes brief explanation regarding the topic, objectives of the research, and the questions to be answered by the chosen respondents. This part of data gathering has been a difficult one to conduct since going out at this time of pandemic is prohibited if there is a valid reason to be given. Since Quezon City is one of the cities in Metro Manila that has been greatly affected by the pandemic period considering its continuous rate of COVID-19 infected patients. However, the ground of this paper would be strongly supported by the employees who are working in the field and their insights would be a great help to achieve the goal of the study.

Below are the following questions and answers relayed to and received from the respondents: Employees on Mid-rise projects in Quezon City, Metro Manila.

1. How does COVID-19 affected your productivity at work and the project as a whole?

Engr. Charlotte Arriola, an Electrical Field Engineer, answered, "*Sobrang laki ng naging apekto ng pandemya in a way na hindi na ako ganun ka flexible. Unlike before nung normal days pa, walang inaalalang kung ano, ngayon kailangan talagang maging extra ingat na. Hindi na lahat possible kasi sa ngayon, kahit isang symptoms lang, pwedeng ma quarantine na and worst, pwedeng maka apekto pa sa buong project."* She also said added, *"Malaki yung nawala sa site mula nung nagka covid, lalo na nung* nagsisimula *pa lang ang crisis. skeletal works nung una kaya konti lang o as in walang accomplishments. Sobrang hirap lalo na sa mga mag RFO project dahil lumaki ung lapses."* But she is still thankful because up to this day, she is still surviving the pressure and danger caused by the pandemic virus.

COVID-19 affected the project including the delay on work execution, as well as the materials delivery which is clearly stated by Engr. Jeffrey Martinez, a Civil Engineer on site as well. He answered*, "Apektado ng malaki ang project site since ang daming adjustments na ginawa tulad ng social distancing, covid protocols. Also, ung mga suppliers ng materyales syempre naapektohan din ng pandemic na to so less din ang manpower nila, less din ang napproduce nilang materyales na need namin sa proeject site."*

Quality Control Engineer, Engr. Romil Cahatol, explained in his own words, given that has already been working in construction field for several years, that "COVID-19 caused a decrease in my productivity at work especially during the earlier period of resumption of construction activities due to adjustment in exercising protocols during work activities. However, my productivity recovered when I became more familiar and comfortable in applying the protocols in my work activities" In addition, Engr. CK Tallada, another Quality Control Engineer on site answered, "Productivity rate or accomplishment of our project site has slowed down in all aspects since COVID-19 happened*."* Wearing face mask and/or face shield is a bit of a hassle shared by Engr. Fremelyn Aguilar, she added, "especially when on site doing the daily walk-through. Aside from being slightly suffocating, it is also irritating and uncomfortable to remove the mask to wipe sweat due to the intensive heat on active floor, thus affects general performance on site."

2. How significant do you think are the working adjustments on site to abide the COVID-19 protocols?

Based on most site engineers that the researchers gotten an answer from, they stated common answer wherein COVID-19 had a major effect in terms of availability and productivity of manpower of the project site. This resulted to the decrease of accomplishment with respect to the construction schedule. Work adjustments on site in order to abide COVID-19 protocols are well-defined and applicable working adjustments on site for COVID-19 protocols are highly necessary in order to minimize the impact of the fear, misconceptions and spread of the pandemic in efficiency of each individual and working relationships of the construction team as a whole.

This question was answered by Engr. Raphael Aguilar, a Management Trainee, rotating Field and Office Engineer, wherein he said that, "The adjustments made to abide several protocols were really essential as to live through this pandemic. Different sets of rules have become known to everyone, requiring discipline and self-imposed awareness. The success of the guidelines still depends on the people following them." Meanwhile, Engr. Fremelyn Aguilar, a field engineer too, gave out an answer to this particular question, saying "Since physical distancing must be observed, the management had decided to have a segregated toolbox for every trade. Face to face general meeting is also prohibited. These things affect the overall communication of the staffs and workers because there is no proper platform where concerns and problems encountered on site can be discussed and resolved."

3. In your own opinion, how important is work sequence and safety guidelines to be implemented on site?

"Proper implementation of effective work sequence and well-defined safety guidelines could assure the continuous and stable availability and efficiency of manpower, which would lead to on-time and well-produced accomplishments." explained by Engr. Romil Cahatol, a Quality Control Engineer. On the other hand, Engr. Charlotte Arriola answered, *"Malaking part yung pagkakaroon ng work sequence at pagsunod sa safety guidelines kasi Dito kasi nakasalalay ang ikakatagumpay ng project. Limited na lang ung time kasi matagal na natigil ung work kaya kailangan talaga may Proper guideline na sinusunod para swabe ung galaw ng trabaho. Also, everyone must be extra careful lalo na ngayong nasa critical stage na ung projects."* Additionally, Engr. CK Tallada mentioned in his statement that work sequence is important in implementation at every project site in order to achieve the targets and monitor every accomplishment at work.

Summarizing the answers of the engineers who have answered the researchers' interview questions, it is evident that COVID-19 pandemic crisis have contributed and impact not only on their safety health condition, but also to their way of living and working in the fieldwork. They gave emphasis in answering the third question which entails the significance of this study, which highlight how they foresee work sequence guidelines in their respective project sites even before the pandemic. As engineers who have been working in the construction even before pandemic crisis, they shared their experiences and struggles as well because of adjustments in terms of work management, work strategies, safety rules enhancement, and maintaining a good workmanship, all at once. Although their industry suffered for months of work stoppage, they said that guidelines are very important to maintain the stability of the project site. Without these guidelines and principles, there would be chaos. Leadership and workmanship among the employees together with their project supervisors should be the main factor to prioritize, may there be a pandemic or none, to be able to attain a successful infrastructure and achieving a zero casualty and fatal rate among workers. These are

not possible if proper safety and technical work scope protocols are announced and properly executed on site.

Analysis and Interpretation of Data

QUESTIONNAIRE 2: LEVEL OF AWARENESS OF THE RESPONDENTS ON MID-RISE CONSTRUCTION SITE STANDARD PROCEDURES, LAWS, AND REGULATIONS

In this part of the research, a questionnaire has been established to determine the level of awareness of the respondents with regards to standard procedures, laws, and regulations when working at mid-rise construction sites amidst pandemic period.

Part 2. Level of awareness of the respondents on mid-rise construction site standard procedures, laws and regulations.					
Instructions: Please indicate your level of awareness with following scale by putting a check mark (✓) on your response.					
Description	Not aware (1)	Less aware (2)	Somewhat Aware (3)	Aware (4)	Fully aware (5)
Standard on Safety and Health					
False Workmanship (Formworks, Concreting, Rebar)					
Work Method Statement on Quality Control Inspection					
Company policy on COVID-19 protocols					
Risk assessment for all work scopes					
Company's Minimum acceptable standards and procedures					
Timetable (Meeting the Building Deadline; Turnover) Strategies and Techniques					

Table 4.6 *Part 2 of the Survey Questionnaire*

Part 2. Level of awareness of the respondents on mid-rise construction site standard procedures, laws and regulations.					
Instructions: Please indicate your level of awareness with following scale by putting a check mark (✓) on your response.					
Description	Verbal interpretation				
	Not aware (1)	Less aware (2)	Somewhat Aware (3)	Aware (4)	Fully aware (5)
Standard on Safety and Health	0	0	0	18	52
False Workmanship (Formworks, Concreting, Rebar)	0	0	6	24	40
Work Method Statement on Quality Control Inspection	0	0	13	18	39
Company policy on COVID-19 protocols	0	0	5	15	55
Risk assessment for all work scopes	0	0	0	13	52
Company's Minimum acceptable standards and procedures	0	0	0	12	58
Timetable (Meeting the Building Deadline; Turnover) Strategies and Techniques	0	0	0	10	60
Total Mean	0	0	3.43	15.71	50.86
Average Mean	14				

Table 4.7 *Part 2 Output Data Representation from the Respondents*

T-Test Analysis of Questionnaire Part 2: Level of awareness of the respondents on mid-rise construction sites standard procedures, laws, and regulations.

Average Mean: $\frac{50.86+15.71+3.43+0+0}{5} = \mathbf{14}$ Hypothesized Mean = **15**

Table 4.8 ***T-test Data for Part 2***

T-Test: One-Sample Part 2 Data

	Part 2: T-test Analysis
Mean	14
Hypothesized Mean	15
t Stat	-0.103552109
P(T<=t) one-tail	0.461254465
t Critical one-tail	2.131846786
P(T<=t) two-tail	0.92250893
t Critical two-tail	2.776445105

Using Microsoft Excel as platform for t-test analysis of the population, having a value of **14** for the actual mean and **15** for the hypothesized mean. The statistical testing shows a t stat value of **-0.103552109**. The t-stat value is checked within the range of $\mp \boldsymbol{t\ stat\ critical\ two-tail\ value.}$ Using the range of t-test critical value it shows **-2.776445105 < 0.414208435 < 2.776445105.** The hypothesis of the t-test analysis is accepted and there is no significant difference in the value of the actual mean and hypothesized mean. The results of the t-test: One-Sample for part 2: Level of agreement of the respondents to working at mid-rise buildings during COVID-19 Pandemic Period, according to profile is correct showing no significant difference on both actual and hypothesized mean.

QUESTIONNAIRE 3: LEVEL OF AGREEMENT OF THE RESPONDENTS TO WORKING AT MID-RISE BUILDINGS DURING COVID-19 PERIOD

In this part of the survey, the researcher prepared a questionnaire to assess and determine the level of agreement of the respondents to working on mid-rise construction sites during COVID-19 pandemic period.

Part 3. Level of agreement of the respondents to working at mid-rise buildings during COVID-19 Pandemic Period, according to profile?					
Instructions: Please indicate your level of agreement with following scale by putting a check mark (✓) on your response.					
Description	**Strongly disagree (1)**	**Disagree (2)**	**Neither agree nor Disagree (3)**	**Agree (4)**	**Strongly agree (5)**
Crowd control in construction elevator					
Limited and/or Adjustment Working hours					
Unstable ground and site condition					
Incomplete safety orientation and program					
Absence of power tools and equipment					
Incomplete working platform					
Leadership and Planning					
Performance Evaluation of Workers and Engineers					
Absence of Employees					
Laid off Workers					
Company's Financial Support					
Context of the Organization					

Table 4.9 *Part 3 of the Survey Questionnaire*

Part 3. Level of agreement of the respondents to working at mid-rise buildings during COVID-19 Pandemic Period, according to profile?					
Instructions: Please indicate your level of agreement with following scale by putting a check mark (✓) on your response.					
Description	Verbal interpretation				
	Strongly disagree (1)	Disagree (2)	Neither agree nor Disagree (3)	Agree (4)	Strongly agree (5)
Crowd control in construction elevator	0	0	8	29	33
Limited and/or Adjustment Working hours	0	11	22	19	18
Unstable ground and site condition	24	29	7	4	6
Incomplete safety orientation and program	34	28	8	0	0
Absence of power tools and equipment	33	26	3	8	0
Incomplete working platform	33	27	0	0	0
Leadership and Planning	0	0	10	24	36
Performance Evaluation of Workers and Engineers	0	0	23	17	30
Absence of Employees	32	26	12	0	0
Laid off Workers	30	24	16	0	0
Company's Financial Support	0	5	18	21	26
Context of the Organization	0	0	17	30	23
Total Mean	15.50	14.67	12.00	12.67	14.33
Average Mean	13.83				

Table 4.10 *Part 3 Output Data Representation from the Respondents*

T-Test Analysis of Questionnaire Part 3: Level of agreement of the respondents to working at mid-rise buildings during COVID-19 Pandemic Period, according to profile.

Average Mean: $\frac{14.33+12.67+12.00+14.67+15.50}{5} = \mathbf{13.83}$ Hypothesized Mean = **15**

T-Test: One-Sample Part 3 Data

	Part 3: T-test Analysis
Mean	13.83333333
Hypothesized Mean	15
t Stat	-1.795462116
P(T<=t) one-tail	0.073506371
t Critical one-tail	2.131846786
P(T<=t) two-tail	0.147012742
t Critical two-tail	2.776445105

Table 4.11 ***T-test data for*** *Part 3*

The value of the actual mean is **13.83** and **15** for the hypothesized mean. The statistical testing shows a t stat value of **-1.795462116.** The t-stat value is checked within the range of $\mp$ ***t stat critical two − tail value.*** Using the range of t-test critical value it shows **-2.776445105 < -1.795462116 < 2.776445105.** The hypothesis of the t-test analysis is accepted and there is no significant difference in the value of the actual mean and hypothesized mean. The results of the t-test: One-Sample for part 3: Level of agreement of the respondents to working at mid-rise buildings during COVID-19 Pandemic Period, according to profile, is correct showing no significant difference on both actual and hypothesized mean.

QUESTIONNAIRE 4: ACTION PLANS TO INCREASE WORK AT HEIGHTS' SAFETY AWARENESS OF CONSTRUCTION WORKERS

In this questionnaire, the intent of the researcher is to identify the action plans needed in the construction site in correlation to increasing work productivity and project quality of employees amidst pandemic period.

Part 4. Action plans to increase work productivity and project quality amidst pandemic period.					
Instructions: Please indicate your level of agreement with following scale by putting a check mark (✓) on your response.					
Description	**Strongly disagree (1)**	**Disagree (2)**	**Neither agree nor Disagree (3)**	**Agree (4)**	**Strongly agree (5)**
Training on company policy					
Improve skills through training					
Develop safe attitude, behavior, and good professional relationship with workers					
Increase frequency of training on field works					
Engage competent supervision					
Observation and work monitoring					
Presence of safety signages in relation to COVID-19 protocols					
Toolbox group meeting changed into online briefing and announcements					

Table 4.12 *Part 4 of the Survey Questionnaire*

Part 4. Action plans to increase work productivity and project quality amidst pandemic period.					
Instructions: Please indicate your level of agreement with following scale by putting a check mark (✓) on your response.					
Description	Verbal interpretation				
	Strongly disagree (1)	Disagree (2)	Neither agree nor Disagree (3)	Agree (4)	Strongly agree (5)
Training on company policy	0	0	0	27	33
Improve skills through training	0	0	0	31	29
Develop safe attitude, behavior, and good professional relationship with workers	0	0	10	24	26
Increase frequency of training on field works	0	0	16	25	29
Engage competent supervision	0	0	20	24	26
Observation and work monitoring	0	0	5	32	35
Presence of safety signages in relation to COVID-19 protocols	0	0	7	37	26
Toolbox group meeting changed into online briefing and announcements	0	0	15	20	35
Total Mean	0	0	9.13	27.50	29.88
Average Mean	13.30				

Table 4.13 *Part 4 Output Data Representation from the Respondents*

T-Test Analysis of One Sample Part 4: Action plans to increase work productivity and project quality amidst pandemic period.

Average Mean: $\frac{29.88+27.50+9.13}{5} = \mathbf{13.3}$ Hypothesized Mean = **15**

T-Test: One-Sample Part 4 Data

	Part 4: T-test Analysis
Mean	13.3
Hypothesized Mean	15
t Stat	-0.261139909
P(T<=t) one-tail	0.403439341
t Critical one-tail	2.131846786
P(T<=t) two-tail	0.806878681
t Critical two-tail	2.776445105

Table 4.14 *T-test Data for Part 4*

The value of the actual mean is **13.3** and **15** for the hypothesized mean. The statistical testing shows a t stat value of **-0.261139909**. The t-stat value is checked within the range of $\mp$ ***t stat critical two − tail value.*** Using the range of t-test critical value it shows **-22.776445105 < -0.261139909 < 2.776445105.** The hypothesis of the t-test analysis is accepted and there is no significant difference in the value of the actual mean and hypothesized mean. The results of the t-test: One-Sample for part 4: Action plans to increase work productivity and project quality amidst pandemic period.

IV. Conclusion

The study shows that the level of awareness of the respondents, including field engineers, office engineers, and project supervisors, who are working on construction sites, specifically mid-rise buildings, which are based on standard procedures, laws, and regulations,

came up with significance results to all sections of gathering data in terms of respondents' age, current designation, years of experience, and type of organization they belong in. The following outcomes demonstrate the fact that working in construction field varies significantly in worker's age, which include their level of physical strength capacity, as well as their current designation, because this study is more focused on construction employees who have already witnessed the work method processes before and during pandemic. More so, they are specifically the expected responsible leaders and role models, as well as implementors towards mandatory orientations or programs using online platforms for example, in order to maintain physical distancing) to withstand the reasonings that hinder work progression in the project.

Furthermore, in consideration with the interview section, the employees have answered based on their real experiences and observation with regards to work guidelines on their respective sites. They fulfilled a strong support for the objectives of the study. They honestly answered the interview questions and pointed out the wrongdoings that have happened before the 'new normal' and the difference and change they have brought upon for the employees, supervisors, workers, and project development. Guidelines in mid-rise construction projects are effective in stabilizing project quality and employees' productivity because should embodied the technical scope, as well as the work management. By allowing guidelines to be applied to all employees on field, there would a progression even with skeletal time of work and adjustment in work schedules among employees.

As the conclusion to this research, the researchers were able to attain the goal of showing and discussing the level of significance and contribution of work sequence guidelines within mid-rise construction sites during pandemic period. As the researchers accomplished the objectives of the study, the researchers came up with instructions and comparisons that show why does a standard action plan and safety protocols are significant; all to serve as a cognizance of the different impacts which could provide proper safety and health guidance both for the construction company and its employees. Therefore, the Guidelines in Mid-rise Construction Buildings in Quezon City has been better and efficient within the past few months up to present when hazards in construction are monitored and controlled by the support of designated laws and protocols. Risks are being monitored too by the help of the employees like site and office engineers for they are the ones who interact more with the workers. Moreover, employees having an awareness most especially in work guidelines is efficient in terms of the quality control procedures, project time sufficiency, controlling of quality system implementations, and provision of actual operations, when safety and health standards are imposed. Risks, accidents, and transmission of COVID-19 could be prevented in a hundred percent state if awareness level is not misguided, and protocols are effectively provided.

It has been proven that the results based on researchers' survey imposes different specifics which can be prioritized more to be able to conduct guidelines in benefit of raising the awareness level in construction field. It proves that hazards of working in construction analysis are continuously linked to project's safety management, as well as regular schedules, magnitude of work injuries, and other related problem cases, which improves lesser rate of problems, delay in reaching target schedule, conflicts between workers, subcontractors and prime contractors, involving work misunderstanding and unfair execution of rules to all.

V. Recommendation

Based on the results of the survey that provide sustainable data and analysis of the answers of questionnaires, as well as the statements given by the credible respondents, this

research paper makes the following recommendation to the next graduating students who wants to aim and focus on safety and health-related topics, mainly revolving in work guidelines, principles, and protocols on work in field of construction. To further improve the study, the researchers recommend generalizing for a larger parameter of the location as a scope of the research. Researchers should have involved more participants at different kinds of construction companies and have a bigger number of respondents to have a stronger result. In addition, it would be a stronger ground of study if researchers will involve the situation correlated in most common changes which resulted to conflicts because of not proper rules being executed; that are happening in the Philippine construction companies, both main contractors and subcontractors.

The researchers proposed Quezon City as the location of the study because it is one of the most rapidly developing cities in Metro Manila in terms of building infrastructures. This place has been a target for most prime contractors in terms of investments hotels, malls, and different kind of businesses. Unfortunately, the city is still dealing with pandemic crisis. Many businesses have taken down, others filed for bankruptcy caused by the work stoppage and strictly community enhanced quarantine nationwide. More so, Philippines should not neglect the safety and health standards, as well as work order principles and guidelines because it is a major fragment in construction, specifically to both employees and workers who are designated to work amidst the on-going pandemic period.

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