

Impact of the Implementation of the Construction Guidelines Practiced Among Industries in Cabanatuan City During Pandemic

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Abstract

Most countries have directed a complete lockdown as the World Health Organization (WHO) announced the corona-virus 2019 (COVID-19) outbreak as a pandemic. Covid 19 cases bring out an alarming increase. It can be seen everywhere through limited mobility and the closure of many on-site businesses and some industries. Human resources as one of the utmost in the construction industry's operations are greatly affected by the pandemic that cannot escape, with some complete shutdowns. Most projects have been put on hold until further notice. The condition resulted in addressing prudently the pandemic's impact at the start and end of the crisis making everyone to future readiness and preparations. The study was purposely understanding the extent of the impact of the pandemic on the implementation of the construction guidelines among the selected construction industries in Cabanatuan City. The findings divulged that majority of the participants were in middle management level positions, and 47 percent of the respondents with an average of 9.5 years of construction work experience had 5 years or less experience. Initial measures through the dissemination of information creating awareness were implemented by most establishments including construction firms along with the social distancing, sanitation, and provision of PPE's as resumption underwent. Respondents experienced the impact of the pandemic on the implementation of the construction guidelines to a moderate extent in terms of materials; manpower; and equipment.

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The significant relationship between the implementation of the construction guidelines and its impact during the pandemic manifested a positive relationship. Therefore, the researchers concluded that the pandemic impacted the implementation of the construction guidelines among the selected construction industries in Cabanatuan City.

Keywords: Pandemic; Construction Industry; Impact; Covid-19; Construction Guidelines.

1. Introduction

In 2019, the abrupt emergence of Coronavirus disease, caused by severe respiratory disorder was first reported in Wuhan, China [1]. Because the disease is infectious and escalate extensively over the world, and on March 2020, the World Health Organization (WHO) officially announced the coronavirus (COVID-19) outbreak a global pandemic. The World Health Organization (WHO) is concerned about the virus's rapid spread and severity, as well as the alarming levels of inaction, and has urged countries to take measures to contain it [2].

According to Yaser Gamil and Abdulsalam Alhagar [3], development and projects were restrain from operation leading them to address the impact of the pandemic for future plans. It was recorded that following a significant increase in COVID 19 instances, numerous countries have imposed an overall national lockdown. These decisions limit the movements of people and resulted in the closure of some businesses across a variety of industries. Rodrigo Duterte, the President of the Philippines, a state of public health emergency in the Philippines under Presidential Proclamation No. 922 s. 2020, addressing the Corona Virus Disease (COVID-19) risk, after which the entire island of Luzon was placed under Enhanced Community Quarantine (ECQ) on March 16, 2020 limiting the spread of COVID-19 cases. Most business activities have been brought to a halt, with the exception of those that fall and categorized as the necessary supplies and medical sectors, as well as essential projects that are required to support the health system and the safety of the public. Relatively, the measures to contain the virus had limited business all over the world, and organizations have shifted to a Work-From-Home (WFH) to accommodate and continue run the business and services remotely. The global pandemic has nothing to deny the impact on people's livelihoods, lifestyles, and industries, including the construction industry, which is highly dependent on human resources. According to the Philippine Domestic Construction Board, Total work stoppage since the declaration of ECQ has had crippling effects not only on workers who are mostly project-based and thus paid daily but also on contractors, the vast majority of whom 88% are small and medium-sized businesses (SMEs). The pandemic impact was also addressed by Ben O. de Vera in his published article in *Inquirer* as he stated the statistical data on the COVID-19 pandemic's impact. The number and value of construction projects during the first quarter of 2020 dropped by more than one-fifth at the end of March to an abrupt stop of construction in Luzon and most of the country under COVID-19 lockdown. The International Labor Organization stressed the impact of COVID-19 on the construction sector, particularly the construction workforce, specifically the vulnerability of workers, and the country's economy. Statistica Research Department stated that the construction industry is an important sector in the Philippine economy, contributing approximately 336 billion Philippine pesos in gross value added during the fourth quarter of 2020. This refers to total construction expenditures by private and public firms, which contracted significantly in 2020, great degree of owing to disruptions caused by the global coronavirus (COVID-19) pandemic. The unexpected threat posed

by the coronavirus (COVID-19) pandemic resulted in construction project delays and even cancellations for residential and non-residential structures. The difficulty in closing projects with the lockdown was identified as one of the major challenges by local construction companies. As a result, the majority of construction workers lost their jobs, causing a decline in the country's current employment situation. The critical condition takes place on how industries handle the situation since most members must be present on-site, thus the government is now urging construction companies to look beyond the domestic market and into international opportunities to participate in recovery efforts. Over time, the Philippine government gradually permitted greater mobility and business operations. Millions of people are preparing to return to work in anticipation of the lifting of the ECQ especially the construction industry, in addition that returning to work should ensure the safety and welfare of the people, particularly those of its employees or workers. Participants in the construction industry still to focus on preventing the virus's occurrence and controlling its spread on the entire workplace, keeping in mind that one COVID-19 case can cause an interruption resulting to delays on the project completion. In 2020 Construction Guidelines for Project Implementation- Safety Guidelines for the implementation of infrastructure projects both for public and private projects [4], the Department of Trade and Industry (DTI) together with Construction Industry Authority of the Philippines (CIAP) organized a technical working group who drafted the "Construction Guidelines for Project Implementation during the period of Public Health and emergency". Technical Working Group are comprising of various sizes of contractor and suppliers from the three major island such as Luzon, Visayas and Mindanao. Resumption of construction in areas under quarantine have to be prepared implementing protocols in line with the Philippine Domestic Construction Board (PDCB), an implementing board of the Construction Industry Authority of the Philippines (CIAP) tasked with developing policies, plans, programs, and strategies for the development of the Philippine construction industry. The policy drafted consists of guidelines regarding Materials, Manpower, Machinery, and Money. This study shall provide data regarding the implementation of the construction guidelines practiced among the construction industries in Cabanatuan City during pandemic and how construction participants assess the impact of the pandemic and to what extent it affects to the implementation of the construction guidelines. From A Look at COVID-19 Impacts on the Construction Industry by James P. Chivilo, Gina A. Fonte, and Gregory H. Koger [5], Varying degrees have experienced the impact from Covid 19 pandemic through responses from different states and levels, construction industry members such as owners, developers, contractors, subcontractors, and supply chain. Resulting in industry members addressing both short-term and long-term business challenges as the construction industry adapts to a new national, and even international, environment. From Pandemic impact felt in construction, too, as projects fall in number, value by Ben O. de Vera Ben O [6] also addressed the pandemic's impact, de Vera stated the statistical data regarding the impact of the COVID-19 pandemic in his published article on inquirer.net. The number and value of construction projects in the first quarter of 2020 dropped by more than one-fifth as the tail end of March halted construction in Luzon and most of the country was placed under COVID-19 lockdown. According to the latest Philippine Statistics Authority (PSA) construction statistics based on building permits approved from January to March, the number of construction projects dropped 22.4 percent to 30,838 from 39,762 in 2019. The value of these construction activities in the first quarter fell by 20.1 percent to P86.1 billion from P107.7 billion a year ago based on PSA data. From One year later: Effect of Covid on the design and construction industry by Arch. Benjamin Panganiban Jr. [7], Arc. Panganiban Jr. addressed several impacts of the COVID-19 pandemic like Change in office scheduling, Design approaches, Regulatory

regimes, Digital technology, Construction management, Safety and security, and Temporary shutdown. From Impact of COVID-19 on the construction sector by International Labour Organization [8], impact on the construction sector were the construction workforce, specifically the vulnerability of construction workers and their direct impact on a country's economy. From Construction sector in the Philippines - statistics & facts by Statista Research Department [9]. Impact in terms Philippine economy, Statistica Research Department stated that the construction industry is a vital sector within the Philippine economy, contributing a gross value added of approximately 336 billion Philippine pesos during the fourth quarter of 2020. In terms of the capital formation, which refers to total construction expenditures by private and public firms, contracted significantly in 2020, owing largely to disruptions caused by the global coronavirus (COVID-19) pandemic. The unexpected challenges posed by the coronavirus (COVID-19) pandemic resulted in construction project delays and cancellations, both residential and non-residential. The difficulty in closing projects due to the lockdown was identified as a major challenge by local construction companies. As a result, the majority of construction workers have been displaced or have lost their jobs permanently, causing a downturn in the country's current employment situation. The Philippine government is now persistently looking beyond the domestic market and into international opportunities in order to participate in recovery efforts including the construction companies. The Statistica Research Department focused on the status of the Build Build Build program to demonstrate the impact of the pandemic on the construction industry, where government figures revealed that only a few projects were completed in 2021, with 31 others still awaiting completion in 2022. From Growth in the Philippines' construction industry to slow down to 1.2% due to COVID-19 containment measures to Global data. Before the COVID-19 outbreak, there was a rapid expansion in the construction industry due to various infrastructure investments together with the publication of the Philippine Construction Industry Roadmap 2020–2030. With the government announcing strict measures to slow the virus's spread, both Global Data, a leading data, and analytics company have forecast that construction output growth to slow to 1.2 percent from 8.0 percent prior to the COVID-19 outbreak projection for 2020. Because of the country's economic difficulties, the Philippines has begun to relieve several restrictions. All public and private construction projects resumption has subjected to General Community Quarantine (GCQ) was permitted on May 15, 2020, while only prioritized construction projects subject to Enhanced Community Quarantine (ECQ) were permitted to resume. According to Dhananjay Sharma, Construction Analyst at Global Data, the country's construction industry will continue to benefit from large-scale infrastructure projects, once the COVID-19 spread is contained. All major infrastructure projects under the Build, Build, Build (BBB) program were allowed to resume on May 13, 2020. Prior to the outbreak, the government planned to invest around PHP1 trillion (US\$18.9 billion) this year in the Build, Build, Build (BBB) program, and its implementation could play a significant role in the country's post-pandemic economic recovery [10]. However, Sharma concludes that the construction industry market is having difficulties due to the deceleration of domestic economy due to the global pandemic and is experiencing additional risk in addition to people taking precautions with regards to construction related purchases because of the deceleration brought by the global pandemic. From Construction Guidelines for Project Implementation by The Philippine Domestic Construction Board (PDCB) In developing the guidelines, the TWG took into account four (4) main components of the construction project process, namely Materials, Manpower, Machinery, and Money, identified as the 4Ms of construction. These were created with SME contractors in mind, who employ the majority of the industry's labor force, as well as large contractors involved in both public and private infrastructure projects, as well as

vertical construction. The guidelines will provide guidance on how to manage manpower during this critical period, they will also guidance on how contractors manage businesses not just for survival, but also to contribute to the country's economic recovery program.

The purpose of the guidelines will establish important principles and minimum requirements for construction-related operations that will help define accountable, healthy, and safe operations during the COVID-19, ensuring business survival as well as worker protection.

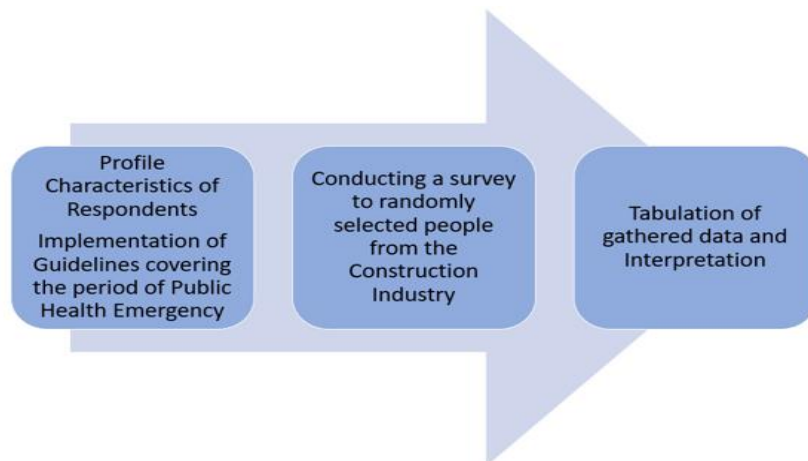


Figure 1: Research Paradigm.

2. Materials and Methods

In determining the extent of the impact of the pandemic to the implementation of construction guidelines among selected construction industries in Cabanatuan City, Philippines the following were conducted;

- Selection of Respondents - Respondents were selected through convenience sampling. Each respondent was given enough time to finish the questionnaire. Frequency, percentage distribution, and measures of central tendency were used as well as a correlation matrix, weighted mean, verbal description and limits for the analysis of data.

Survey Questionnaire - Survey questionnaire was the primary instrument for this study. Questionnaire consists of a succession of questions relevant to the topical area aiming to collect information from respondents. There are three (3) parts, namely: Part I deals with the profile of the respondent. Part II is about the assessment of the implementation of the construction guidelines practiced among industries in Cabanatuan City during pandemic. Part III is about the how construction participants assessment of the extent of the impact of the pandemic to the implementation of the construction guidelines. Data were analyzed through the used of weighted mean (WM), frequency, percentage distribution and Pearson Product Moment Correlation Coefficient (Pearson r).

The study aims to determine the implementation of the construction guidelines practiced among the construction industries in Cabanatuan City during pandemic and how construction participants assess the extent of the impact of the pandemic to the implementation of the construction guidelines.

The respondents were chosen using the convenience sampling technique. To have accurate responses construction firms that have PCAB licenses will be considered in the study because Philippine Domestic Construction Board (PDCB) and Philippine Contractors Accreditation Board (PCAB) are both one of the implementing Boards in the Construction Industry Authority of the Philippines (CIAP). The questionnaire is the main tool that the researcher used to gather information which is purposely designed for the study. The questionnaires were given through face-to-face questionnaire. This study focuses on Materials, Manpower, and Machinery Section of the Construction Guidelines for Project Implementation during the period of Public Health Emergency created by the Philippine Domestic Construction Board (PDCB) for the industry in preparation for resumption of construction work in areas under quarantine. The study will not focus on other implemented construction guidelines before the pandemic and other construction guidelines that were implemented for the pandemic.

3. Results and Discussion

To describe the perception of construction industry participants to the impact of rectified construction guidelines on the construction industry practices, Likert Scale was used, which was developed for the principle of measuring attitudes by asking people to respond to a series of statements about a topic, in terms of the extent to which they agree with them, and so tapping into the cognitive and affective components of attitudes. Profile characteristics of the respondents [11].

Age The age of the respondents are distributed as follows: There are 3.4% respondents whose age are 20 years and below; while majority of the respondents are 21 to 30 years old with 39.7%; followed by 31 to 40 years old with 25%; there are also 18.1% respondents who are in the 41 to 50 age bracket; while there are 8.6% respondents who are 51 to 60 years old; lastly with 5.2% respondents who are in the 61 years and above age bracket. The mean age of the respondents is 36 years old.

The result revealed that almost 40 percent of the respondents who work in the construction firms belong to the 21 to 30 age bracket. This age is mostly appropriate for individuals who are working in construction companies, most specially for males, hence strength and endurance is mostly required.

Sex The following is a breakdown of the respondents' sex: There are 9.5% female respondents; while the majority with 90.5% are male respondents.

The majority of respondents at construction industry are male, according to the findings. The construction sector is typically dominated by men. Equal opportunity for women faces a significant barrier. Women have a particularly low participation rate in the construction industry (D. Amaratunga, 2006)[12].

Civil Status The civil status of the respondents are distributed as follows: There are 50% respondents whose civil status are single; while the other half or 50% of the respondents are married.

Years of Experience The years of experience of the respondents are distributed as follows: The majority are 47.41% respondents whose experience are 5 years and below; The 35.34% respondents which have 6 to 16 years

of experience; followed by 17 to 27 years of experience with 10.3% respondents; there are also 4.3% respondents who are in the 28 to 38 years of experience bracket; lastly there are 2.6% respondents who are in the 39 years and above years of experience in the construction industry bracket. The mean years of experience in the construction industry is 9.5 years.

The result revealed that almost 50 percent of the respondents who work in the constructions firms belong to the 5 and below years of experience bracket.

Position in the Organization The following is a breakdown of the respondents' position in the company: There are 33.6% low level management respondents; while majority 59.5% of the respondents belong in the middle level management; lastly there are 6.9% respondents who are in top level management level position in the Organization.

The result revealed that almost 60 percent of the respondents who work in the constructions firms belong to the middle management level position in the construction organization.

To summarized, respondents who are 21 to 30 years old dominated the population of the respondents; with 36 years old as the mean age. More than 90 percent of respondents in the construction industries were male. In terms of civil status, 50 percent of the respondents were single, and the rest were married. Majority of the respondents worked in the construction's firms in middle management level positions. Most or more than 47 percent of the respondents have 5 years and below experience in construction works, with an average of 9.5 years.

3.1. Implementation of the construction guidelines practiced among the construction industries in Cabanatuan City; Materials, Manpower, and Machineries

3.1.1. Implementation of Construction Guidelines in terms of Materials

The respondents strongly agree that the following guidelines during pandemic were implemented in their construction firms: "All the equipment and material deliveries are carefully planned and monitored in our construction industry" (WM =3.67); "The transition and delivery zones in the construction firm are identified and limited to selected personnel, i.e., receivers and deliverers" (WM= 3.56); "All cargo in the construction firm undergoes proper disinfection procedures before use" (WM=3.39); and "The transition personnel in the construction firm are regularly monitored, always provided required Personal Protective Equipment (PPEs) and may be included for optional testing" (WM=3.30); on the other hand, the respondents moderately agreed that "As much as possible, during pandemic, the cargo in their construction firm is unloaded only by the receivers, while the deliverers do not leave their vehicles/ the deliverers must unload while the receiver has to wait at a secured distance until completed" (WM=3.12).

The above result showed that during pandemic, the construction guidelines in terms of materials were very much practiced by the respondents (WM=3.41); except for the unloading of cargo deliveries, wherein the deliverers are obliged to leave their vehicles and unload the materials because most of the time, There is no

formally designated position for the one who is receiving, most of the time only the available laborers or workers receive packages of materials.

The findings are in agreements with Fredrick Simpeh & Christopher Amoah's Assessment of measures instituted to curb the spread of COVID-19 on construction site [12], stated that it is evident that most South African construction companies have instituted prescribed and appropriate measures to curb the virus's spread on site. Measures including social distancing, sanitization, provision of PPEs and dissemination of information or creating awareness were well-implemented by all participating construction firms.

3.1.2. Implementation of Construction Guidelines in terms of Manpower

The respondents strongly agree that the following guidelines during pandemic were implemented in their construction firms: "Regular monitoring of personnel's health, especially for COVID-19 symptoms is observed in the construction the construction firm during the pandemic" (WM=3.59). "Social distancing is also observed at the construction site and in the office during the pandemic" (WM=3.66). "All workers in the construction firm wear proper facemasks and clothing as prescribed by the DOLE-OSHS" (WM=3.75). "There are disinfection in the workplace, shuttles and accommodations to prevent the spread of the virus among the workers." (WM=3.52). "Infographics, signages, and posters on health and safety measures are posted at entry points and strategic areas in the construction firm. (Daily updates on latest developments, Self Screening measures, COVID -19 hotlines)." (WM=3.41).

The result showed above that during pandemic, the construction guidelines in terms of manpower were very much practiced by the respondents (WM=3.59).

In support to the findings a study (January 2022) "Safety and health management response to COVID-19 in the construction industry: A perspective of fieldworkers" stated that the study contributes to practice by informing construction firms on the usage and perceived effectiveness of COVID-19 countermeasures and identifying opportunities for improvement in approaches used to mitigate the spread of the virus among construction fieldworkers. It highlights the need to continue aimed even small company with limited resources for occupational and health standards. The fieldworkers are slightly satisfied with the safety and health measures implemented by their companies to control, prevent, and mitigate the spread of COVID-19 on construction job sites.

3.1.3. Implementation of Construction Guidelines in terms of Machinery

The respondents strongly agree that the following guidelines during pandemic were implemented in their construction firms: "Equipment needs to be transferred to other construction sites; transporting driver including the assistant is recorded." (WM=3.90); "At the delivery site in transport, equipment is properly endorsed in our construction firm during pandemic." (WM=3.70); "Once the equipment is received in our construction company, the transporting driver including the assistant is recorded for health tracing purposes to avoid the spread of the virus during pandemic." (WM=3.62); "equipment is cleaned with disinfectants before and after each day's work, concentrating on points of contact such as door handles of equipment." (WM=3.63); and "all

delivered equipment are cleaned and disinfected before use for safety purposes.” (WM=3.53)

The above result showed that during pandemic, the construction guidelines in terms of machinery were very much practiced by the respondents (WM=3.68);

The findings are significant with a study from “**COVID-19 guidelines incorporated in the health and safety management policies of construction firms**” by Fredrick Simpeh, Christopher Amoah (2021) [13] the findings are in agreements with the section of Simpeh and Amoah’s study that shows that most construction companies have incorporated aspects of COVID-19 guidelines into the site health and safety policies, whereas the majority of the companies had incorporated guidelines such as site access, handling of COVID-19 cases, induction, screening and social distancing;

The findings however are in disagreement with the section of the study that only a few had incorporated guidelines such as compliance, sanitation, sick leave, wearing of personal protective equipment, audit and risk assessment, lunchtime rules and grouping of workers into the health and safety policies on site.

3.2. Extent of the impact of the pandemic to the implementation of the construction guidelines; Materials, Manpower, and Machineries

3.2.1. Impact to the Implementation of the Construction Guidelines in terms of Materials

The respondents moderately agree that the following guidelines during pandemic have an impact in the implementation of the Construction Guidelines in their construction firms: “Due to the implementation of new guidelines during the pandemic, the everyday used materials were needed to disinfect, this causes the delay of work and interruption of planning and scheduling” (WM=2.79); “The implementation of the new guidelines during the pandemic that all cargo materials in the construction firm must undergo proper disinfection procedures resulted in additional cost. (Cost overrun)” (WM=3.15); “The implementation of guidelines requirement for social distancing, checkpoints, and minimum capacities for establishments caused restricted movement and delayed the delivery of materials. (Time Overrun)” (WM=2.92); “The implementation of the new guidelines during the pandemic affected the creation and issuance of documents and permits, which caused delays for mobilization of materials” (WM=2.71); “The implementation of new guidelines during pandemic caused additional labor work as the materials were needed to disinfect every after use” (WM=2.83).

The above result showed that during pandemic, respondents experienced the impact of the pandemic to the implementation of the construction guidelines to a moderate extent in terms of materials (WM=2.88);

Upon the Extent of the Impact of the Pandemic to the Implementation of the Construction Guidelines assessment in terms of materials, the respondents’ perception upon guideline’s requirement for the implementation of the new guidelines during the pandemic that all cargo materials in the construction firm must undergo proper disinfection procedures resulted in additional cost. (Cost overrun) gathered the highest weighted mean (WM=3.15). The construction participants perceived that the Cost overrun is affected the most in terms of materials during pandemic upon the implementation of the Construction Guidelines. The financial impact is

caused by the Contractors' need to ensure that materials were properly disinfected in order to comply with the pandemic guidelines in the period of Public Health Emergency is associated with additional cost.

As a matter of fact, the construction industry, which has long been a major source of economic growth, has been completely shut down. Construction stakeholders are dealing with a number of difficulties as construction prices continue to rise due to worker safety and health compliance, project suspension and termination, and productivity loss according to N.A. Abdullah and colleagues 2021[14].

3.2.2. Impact to the Implementation of the Construction Guidelines in terms of Manpower

The respondents moderately agree that the following guidelines during pandemic have an impact in the implementation of the Construction Guidelines in their construction firms: "The implementation of new guidelines for the pandemic, for manpower having symptoms of Covid19 such as fever, loss of taste, cough and cold, and being quarantined for 15 days cause delays in construction" (WM=3.05); "The guideline's requirement for proper work attire for manpower with necessary PPE (face masks, gloves, goggles, face shields, etc.) generated additional charges. (Cost overrun)" (WM=3.25); "Newly guidelines implemented about border restriction causes inconvenience for the workers in terms of transportation. (Restriction of movement)" (WM=2.83); "Implemented lockdown due to guidelines in pandemic affects the income of the workers especially on "no work, no pay" policy." (WM=2.97); and "The implementation of new guidelines during pandemic caused shifting/work from home and limited capacity for work. (Labor Impact)" (WM=3.24).

The above result showed that during pandemic, respondents experienced the impact of the pandemic to the implementation of the construction guidelines to a moderate extent in terms of manpower (WM=3.07);

Upon the Extent of the Impact of the Pandemic to the Implementation of the Construction Guidelines assessment in terms of Manpower, The respondents' perception upon guideline's requirement for proper work attire for manpower with necessary PPE (face masks, gloves, goggles, face shields, etc.) generated additional charges. (Cost overrun)" gathered the highest weighted mean (WM=3.25). The construction participants perceived that the Cost overrun is affected the most in terms of manpower during pandemic upon the implementation of the Construction Guidelines. The financial impact is caused by the Contractors' need to buy face masks, gloves, goggles, face shields, etc. in order to comply with the pandemic guidelines and to ensure manpower safety in the period of Public Health Emergency is associated with additional cost.

It is statically proven that the most impacting factor of Pandemic on construction Projects is the suspension of projects, labor impact and job loss, time overrun, cost overrun, and financial impact (Gamil & Alhagar, 2020)[3]

3.2.3. Impact to the Implementation of the Construction Guidelines in terms of Machineries

The impact of the implementation of the construction guidelines in terms of machineries. The respondents moderately agree that the following guidelines during pandemic have an impact onto their construction firms. "The guidelines of cleaning and disinfecting of delivered equipment during pandemic caused delay of construction" (WM=2.91); "The implementation of the new guidelines during the pandemic in compliance with

safety and health standards affects sources of financing in terms of actions such as planning, monitoring, and transferring equipment to the construction site” (WM=3.19); “The guidelines resulted to the lockdown of inter province that resulted to the restriction of movement for machineries” (WM=2.61); “The implementation of the new guidelines during the pandemic affected the creation and issuance of documents and permits, which caused delays for transportation of machineries” (WM=2.65); “The implementation of the new guidelines during the pandemic decreased the functionality of labor in using equipment due to sharing because there is a possibility of COVID-19 transmission” (WM=2.85).

The above result showed that Impact of the Pandemic to the Implementation of the Construction Guidelines be assessed in terms of Machineries were little. (WM= 2.84). According to the interviewed respondents.

The respondents agree that they have been affected by the impact of these construction guidelines in terms of machineries. It caused them delay because they have to do these guidelines before their work starts, and some once every week. Guidelines such as disinfecting of the equipment and machines. Kevin M. Kniffin, and colleagues June 2020[15] observed that there is variation across and within industries with respect to how COVID-19 has affected both the demands and resources associated with given jobs and that there is evidence suggesting that working conditions have deteriorated for most employees. The result showed that during pandemic, respondents experienced the impact of the pandemic to the implementation of the construction guidelines to a moderate extent in terms of materials; manpower; and equipment. Statements in connection with financial impact or cost overrun is the leading factor that the construction participants perceive to be the impact of the pandemic to the implementation of the construction guidelines in terms of Materials, Manpower, and Machines. The construction participants perceive that the construction firms’ management allocate additional funds in order to comply with the pandemic construction guidelines. It is statically proven that the most impacting factor of Pandemic on construction Projects is the suspension of projects, labor impact and job loss, time overrun, cost overrun, and financial impact.

3.3. Relationship between the implementation and perceived impact of the construction guidelines

Table 2: Correlation Matrix for the Significant Relationship between the Implementation and Impact of the Construction Guidelines during Pandemic.

Impact		Implementation		
		Materials	Manpower	Machineries
Materials	Pearson Correlation	.473**	.513**	.368**
	Sig. (2-tailed)	.000	.000	.000
	N	116	116	116
Manpower	Pearson Correlation	.408**	.530**	.310**
	Sig. (2-tailed)	.000	.000	.001
	N	116	116	116
Machineries	Pearson Correlation	.513**	.548**	.263**
	Sig. (2-tailed)	.000	.000	.004
	N	116	116	116

*. Correlation is significant at the 0.05 level (2-tailed).

***. Correlation is significant at the 0.01 level (2-tailed).*

The result in Table 2 shows the correlation matrix for the significant relationship between the implementation of the construction guidelines and its impact in terms of materials, manpower and machineries. The result revealed that all the three variables of implementation are significantly correlated to the impact of the implementation of the construction guidelines during pandemic to wit: implementation in terms of materials and impact in terms of materials ($r=.473^{**}$); implementation of materials and impact of manpower ($r= .408^{**}$); implementation of materials and impact of machineries ($r=.513^{**}$); implementation of manpower and impact of materials ($r=.513^{**}$); implementation of manpower and impact of manpower ($r=.530^{**}$); implementation of manpower and impact of machineries ($r=.548^{**}$); implementation of machineries and impact of materials ($r=.368^{**}$); implementation of machineries and impact of manpower ($r=.310^{**}$); and implementation of machineries and impact of machineries ($r=.263^{**}$).

The significant value obtained for the above variables was less than the significant value of .05. This indicate that significant relationship was established between the implementation of the construction guidelines during pandemic and the impact of the implementation of the construction guidelines in the sample construction firms in Cabanatuan City.

The significant relationship between the implementation of the construction guidelines and its impact during pandemic manifested a positive relationship. This means since the respondents strongly agreed that the guidelines are properly implemented inside their construction firms, the implementation caused moderate impact to the operation of the construction firms in terms of materials, manpower and machineries. Such impacts were established in terms of cost overrun, time overrun, financial impact and labor impact.

3.4. Significant difference in the perceived implementation and impact of the construction guidelines among the industries in Cabanatuan City when grouped according to the profile characteristics

Table 3: Analysis of Variance Table for the Significant Difference in the Implementation and Impact of the Construction Guidelines and Age.

Age and Implementation		Mean	F	Sig.	Interpretation
Age and Materials	20 years old and below	3.1500	.975	.436	Not Significant
	21 to 30 years old	3.4304			
	31 to 40 years old	3.3517			
	41 to 50 years old	3.5238			
	51 to 60 years old	3.3800			
	61 years old and above	3.3333			
Age and Manpower	20 years old and below	3.2500	1.170	.328	Not Significant
	21 to 30 years old	3.6000			
	31 to 40 years old	3.5862			
	41 to 50 years old	3.6286			
	51 to 60 years old	3.5600			
	61 years old and above	3.6333			
Age and Machineries	20 years old and below	3.6000	.560	.731	Not Significant
	21 to 30 years old	3.6783			

	31 to 40 years old	3.6828			
	41 to 50 years old	3.7429			
	51 to 60 years old	3.5800			
	61 years old and above	3.6000			
Age and Impact		Mean	F	Sig.	Interpretation
Age and Materials	20 years old and below	2.6000	1.308	.266	Not Significant
	21 to 30 years old	3.0217			
	31 to 40 years old	2.6621			
	41 to 50 years old	3.1333			
	51 to 60 years old	2.6800			
	61 years old and above	2.4667			
Age and Manpower	20 years old and below	2.6500	.756	.583	Not Significant
	21 to 30 years old	3.2043			
	31 to 40 years old	2.9586			
	41 to 50 years old	3.1619			
	51 to 60 years old	2.7667			
	61 years old and above	3.0672			
Age and Machineries	20 years old and below	2.1500	1.333	.255	Not Significant
	21 to 30 years old	2.9870			
	31 to 40 years old	2.6207			
	41 to 50 years old	3.0952			
	51 to 60 years old	2.6600			
	61 years old and above	2.8414			

3.4.1. Age and Implementation and Impact of the Construction Guidelines

The result in Table 3 shows the Analysis of Variance for the significant difference between the variable age of the respondents and implementation and impact of the construction guidelines.

The computed values were as follows: Age and implementation in terms of materials (F=.975); age and implementation in terms of manpower (F=1.170); age and implementation in terms of machineries (F=.560). The same no significant result was established between the following variables: age and impact in terms of materials (F=1.308); age and impact in terms of manpower (F=.756); and age and impact in terms of machineries (F=1.333).

Table 4 : Analysis of Variance Table for the Significant Difference in the Implementation and Impact of the Construction Guidelines and Sex.

Sex and Implementation		Mean	F	Sig.	Interpretation
Sex and Materials	Male	3.3810	6.138	.015	Significant
	Female	3.6727			
Sex and Manpower	Male	3.5733	2.683	.104	Not Significant
	Female	3.7273			
Sex and Machineries	Male	3.6629	2.200	.141	Not Significant
	Female	3.8000			
Sex and Impact		Mean	F	Sig.	Interpretation
Sex and Materials	Male	2.8362	2.499	.117	Not Significant
	Female	3.2909			
Sex and Manpower	Male	3.0190	3.445	.066	Not Significant
	Female	3.5273			
Sex and Machineries	Male	2.7771	5.042	.027	Significant
	Female	3.4545			

3.4.2. Sex and Implementation and Impact of the Construction Guidelines

The result in Table 4 clearly manifested that significant difference was established for the variables: sex and implementation of the construction guidelines in terms of materials (F=6.138); and sex and impact of the construction guidelines in terms of machineries (F=5.042). The hypothesis of no significant difference for these variables is rejected.

The significant difference clearly manifested that male and female respondents differ in their belief regarding the implementation of the construction guidelines.

Examining the computed mean for sex and implementation in terms of materials, the mean of the response of the female respondents (Mean=3.6727) is higher than the mean of the response of the male respondents (Mean=3.3810).

The same observation is presented for the significant difference in the response of the female respondents to the impact of the construction guidelines in terms of machineries (Mean=3.4545); and male (Mean=2.7771). The mean of the female respondents’ response is higher than the response of the male respondents.

Table 5 : Analysis of Variance Table for the Significant Difference in the Implementation and Impact of the Construction Guidelines and Civil Status.

Civil Status and Implementation		Mean	F	Sig.	Interpretation
Civil Status and Materials	Single	3.4103	.002	.961	Not Significant
	Married	3.4069			
Civil Status and Manpower	Single	3.6000	.188	.665	Not Significant
	Married	3.5759			
Civil Status and Machineries	Single	3.6897	.255	.615	Not Significant
	Married	3.6621			
Civil Status and Impact		Mean	F	Sig.	Interpretation
Civil Status and Materials	Single	2.8828	.002	.968	Not Significant
	Married	2.8759			
Civil Status and Manpower	Single	3.0862	.054	.816	Not Significant
	Married	3.0483			
Civil Status and Machineries	Single	2.8345	.006	.939	Not Significant
	Married	2.8483			

3.4.3. Civil Status and Implementation and Impact of the Construction Guidelines

The Analysis of variance for the significant difference between the variable civil status and implementation and impact of the construction guidelines in terms of materials, manpower and machineries showed that no significant difference was establish. The computed F-values were as follows: Civil Status and implementation in terms of materials (F=.002); civil status and implementation in terms of manpower (F=.188); and civil status and implementation in terms of machineries (F=.255).

For the computed F-value between civil status and impact of the construction guidelines, the F-values were as follows: Civil status and impact in terms of materials (F=.002); civil status and impact in terms of manpower

(F=.054); and civil status and impact in terms of machineries (F=.006). The results indicate that the perceive implementation and impact of the construction guidelines do not differ among single and married respondents.

Table 6: Analysis of Variance Table for the Significant Difference in the Implementation and Impact of the Construction Guidelines and Years of Experience.

Years of Experience and Implementation		Mean	F	Sig.	Interpretation
Years of Experience and Materials	5 years old and below	3.4145	.671	.613	Not Significant
	6 to 16 years	3.4488			
	17 to 27 years	3.2500			
	28 to 38 years	3.4400			
	39 to 49 years	3.3333			
Years of Experience and Manpower	5 years old and below	3.5782	.422	.793	Not Significant
	6 to 16 years	3.6244			
	17 to 27 years	3.5000			
	28 to 38 years	3.6000			
	39 to 49 years	3.6000			
Years of Experience and Machineries	5 years old and below	3.6982	.267	.899	Not Significant
	6 to 16 years	3.6634			
	17 to 27 years	3.6333			
	28 to 38 years	3.6000			
	39 to 49 years	3.7333			
Years of Experience and Impact		Mean	F	Sig.	Interpretation
Years of Experience and Materials	5 years old and below	3.0545	1.200	.315	Not Significant
	6 to 16 years	2.7902			
	17 to 27 years	2.6500			
	28 to 38 years	2.5200			
	39 to 49 years	2.4000			
Years of Experience and Manpower	5 years old and below	3.1709	.739	.567	Not Significant
	6 to 16 years	3.0585			
	17 to 27 years	2.8500			
	28 to 38 years	2.8400			
	39 to 49 years	2.5333			
Years of Experience and Machineries	5 years old and below	2.9855	.917	.457	Not Significant
	6 to 16 years	2.8049			
	17 to 27 years	2.4833			
	28 to 38 years	2.6800			
	39 to 49 years	2.4000			

3.4.4. Years of Experience and Implementation and Impact of the Construction Guidelines

The result in Table 6 shows that the computed F-values for the significant difference between the numbers of years of experience of the respondents and the implementation and impact of the construction guidelines during pandemic yields no significant difference.

The F-values were as follows: years of experience and implementation in terms of materials (F=.671); years of experience and implementation in terms of manpower (F=.422); and years of experience and implementation in terms of machineries (F=.267).

In terms of the variable years of experience and impact in terms of materials (F=1.200); years of experience and

impact in terms of manpower ($F=.739$); and years of experience and impact in terms of machineries ($F=.917$). The result manifested that the number of years of experience that the respondents have in the construction company does not contribute to their perceived implementation and impact of the construction guidelines during pandemic.

Table 7 : Analysis of Variance Table for the Significant Difference in the Implementation and Impact of the Construction Guidelines and Position.

Position and Implementation		Mean	F	Sig.	Interpretation
Position and Materials	Low Level	3.3744	.316	.730	Not Significant
	Middle Level	3.4319			
	Top Management	3.3750			
Position and Manpower	Low Level	3.5538	.530	.590	Not Significant
	Middle Level	3.6116			
	Top Management	3.5500			
Position and Machineries	Low Level	3.6718	.006	.994	Not Significant
	Middle Level	3.6783			
	Top Management	3.6750			
Position and Impact		Mean	F	Sig.	Interpretation
Position and Materials	Low Level	2.9128	1.065	.348	Not Significant
	Middle Level	2.8116			
	Top Management	3.3000			
Position and Manpower	Low Level	3.0974	1.656	.196	Not Significant
	Middle Level	2.9913			
	Top Management	3.5750			
Position and Machineries	Low Level	2.8205	.764	.468	Not Significant
	Middle Level	2.8058			
	Top Management	3.2500			

3.4.5. Position Level and Implementation and Impact of the Construction Guidelines

The result in Table 7 revealed that no significant difference was established between the following variables: position level and implementation in terms of materials ($F=.316$); position level and implementation in terms of manpower ($F=.530$); and position level and implementation in terms of machineries ($F=.006$).

The same result is manifested between the variables: position level and impact in terms of materials ($F=1.065$); position level and impact in terms of manpower ($F=1.656$); and position level and impact in terms of machineries ($F=.764$).

The obtained values manifested that position level of the respondents in their respective construction companies do not contribute to their perceived implementation and impact of the construction guidelines during pandemic.

4. Conclusion

The profile characteristics of the respondents showed that majority of them are 21 to 30 years old; male; 50 percent are single, and 50 percent are married; have been working in construction industries for 5 years and below; and belongs to middle management level positions.

The implementation of the construction guidelines practiced among the construction industries in Cabanatuan City during pandemic showed that in terms of Materials were very much practiced except for the unloading of cargo deliveries, wherein the deliverers are obliged to leave their vehicles and unload the materials because most of the time.

There is no formally designated position for the one who is receiving, most of the time only the available laborers or workers receive packages of materials; Manpower were very much practiced; and in Machinery were very much practiced by the respondents.

The extent of the impact of the pandemic to the implementation of the construction guidelines showed that in terms of; Materials the respondents experienced a moderate extent were the respondents' perception upon guideline's requirement that all cargo materials in the construction firm must undergo proper disinfection procedures resulted in additional cost; Manpower the respondents experienced a moderate extent were the respondents' perception upon guideline's requirement for proper work attire with necessary PPE (face masks, gloves, goggles, face shields, etc.)

generated additional charges and in Machinery the respondents experienced a moderate extent were the respondent's perception upon the guidelines requirement caused delay because they have to do these guidelines before their work starts, and some once every week.

Guidelines such as disinfecting of the equipment and machines. The significant relationship between the implementation of the construction guidelines and its impact during pandemic manifested a positive relationship that showed the respondents strongly agreed that the guidelines are properly implemented inside their construction firms, the implementation caused moderate impact to the operation of the construction firms in terms of materials, manpower and machineries. Such impacts were established in terms of cost overrun, time overrun, financial impact and labor impact.

There is significant difference in the perceived implementation and impact of the construction guidelines among the industries in Cabanatuan City to the profile characteristics of the respondents' sex and implementation of the construction guidelines in terms of materials and machineries.

References

- [1] Hui, D. S., Azhar, E. I., Madani, T. A., Ntoumi, F., Kock, R., Dar, O., ... & Petersen, E. (2020). The continuing 2019-nCoV epidemic threat of novel coronaviruses to global health—The latest 2019 novel coronavirus outbreak in Wuhan, China. *International journal of infectious diseases*, 91, 264-266.
- [2] Cucinotta, D., & Vanelli, M. (2020). WHO declares COVID-19 a pandemic. *Acta bio medica: Atenei parmensis*, 91(1), 157.

- [3] Gamil, Y., & Alhagar, A. (2020). The impact of pandemic crisis on the survival of construction industry: a case of COVID-19. *Mediterranean Journal of Social Sciences*, 11(4), 122-122.
- [4] Construction guidelines for project implementation: Construction industry authority of the Philippines. Construction Guidelines for Project Implementation | Construction Industry Authority of the Philippines. (2020, June 10). Retrieved September 20, 2021, from <https://ciap.dti.gov.ph/content/construction-guidelines-project-implementation>.
- [5] Ilatova, E., Abraham, Y. S., & Celik, B. G. (2022). Exploring the Early Impacts of the COVID-19 Pandemic on the Construction Industry in New York State. *Architecture*, 2(3), 457-475.
- [6] De Vera, B. O. (2020). World Bank: Pandemic to sink 2.7 M more Filipinos in poverty. *Inquirer. net*. Accessed March, 11, 2021.
- [7] Panganiban, B. Jr (2021). The Manila Times. <https://www.manilatimes.net/2021/05/04/business/real-estate-and-property/one-year-later-effect-of-covid-on-the-design-and-construction-industry/869629>
- [8] World Health Organization. (2021). COVID-19: occupational health and safety for health workers: interim guidance.
- [9] Statista Research Department. (2021). Statista.
- [10] Growth in the Philippines construction industry to slow down to 1.2% due to covid-19 containment measures, says GlobalData. GlobalData. (2020, May 28). Retrieved September 20, 2021, from <https://www.globaldata.com/growth-in-the-philippines-construction-industry-to-slow-down-to-1-2-due-to-covid-19-containment-measures-says-globaldata/>
- [11] theintactone (2019). Thurstone Scale, Likert Scale and Semantic Differential Scale. <https://theintactone.com/2019/02/19/rm-u3-topic-5-thurstone-scale-likert-scale-and-semantic-differential-scale/#:~:text=The%20most%20widely%20used%20is,and%20affective%20components%20of%20attitudes>.
- [12] Amaratunga D. (2006). Construction Industry and Women: A Review of the Barriers. Reasearch Gate. https://www.researchgate.net/publication/229016542_Construction_Industry_and_Women_A

_Review_of_the_Barriers

- [13] A., & Amoah, F. S. & C. (n.d.). Assessment of measures instituted to curb the spread of covid-19 on Construction Site. Taylor & Francis. Retrieved April 2022, from <https://www.tandfonline.com/doi/full/10.1080/15623599.2021.1874678>.
- [14] Rao, M., Rashid, F. A., Sabri, F. S., Jamil, N. N., Seradja, V., Abdullah, N. A., ... & Ahmad, N. (2021). COVID-19 screening test by using random oropharyngeal saliva. *Journal of medical virology*, 93(4), 2461-2466.
- [15] Kniffin, K. M., Narayanan, J., Anseel, F., Antonakis, J., Ashford, S. P., Bakker, A. B., ... & Vugt, M. V. (2021). COVID-19 and the workplace: Implications, issues, and insights for future research and action. *American psychologist*, 76(1), 63.