

Covid-19 Effect to Conventional and IBS Construction Project at Kuala Lumpur, Malaysia

Mohamad Hafiz Syamil Ainal Azhar¹, Muhammad Fikri Hasmori^{2*}

¹Faculty of Civil Engineering and Built Environment,
Universiti Tun Hussein Onn Malaysia, Batu Pahat, Johor, 86400, MALAYSIA

*Corresponding Author Designation

DOI: <https://doi.org/10.30880/rtcebe.2022.03.01.130>
Received 4 July 2021; Accepted 13 December 2021; Available online 15 July 2022

Abstract: The Covid-19 epidemic caused widespread worldwide disruption. Forcing lockdowns in several countries, including Malaysia, in an effort to stop the virus from spreading. As an initiative, the Malaysian government come out with Movement Control Order (MCO) as one of the lockdown choices, started on March 18, 2020. As a result, the MCO had a massive impact on the Malaysian industrial sector, including the construction industry. This study aims to investigate the effect Covid-19 to a conventional and industrialized building system (IBS) construction project. Besides that, the scope of this study conducted based in Kuala Lumpur, Malaysia. The data collected were analyzed by Statistical Package Social Science (SPSS) and Average Index Analysis. Frequency analysis was used to identify the effect of the Covid-19 pandemic in the construction industry. The questionnaires were distributed after conducted the expert review and pilot study with the 5-expert review from site engineer. The statistical significance index method was used to measure the awareness of the Covid-19 prevention measure at the construction site. The study found most respondents acknowledge Covid-19 and the spreading among people, acknowledge workers about Standard Operation Procedure (SOP) during MCO at the construction site, and also employer provides sanitation station before entering the construction site. In addition, this study also found the conventional project method was the most affected due Covid-19 outbreak than the IBS project method. The findings help employer, site safety officer to realize the consequences of the sudden epidemic and prepare for the worst-case scenario during the planning stage of the construction projects.

Keywords: Pandemics, Covid-19, MCO

1. Introduction

The World Health Organization (WHO) proclaimed the 2019 coronavirus disease (Covid-19) a pandemic at the end of 2019 following the spreading of the new virus worldwide [1]. This pandemic

*Corresponding author: mfikri@uthm.edu.my

causes major industry affected all country including Malaysia, which is the tourism industry, construction industry, oil and gas industry, aviation industry, and many more. Due to the spread of Covid-19 in these countries and the related economic consequences of the national shutdown, the construction sector, which is one of the core components of many national economies also faces unique challenges. Construction Industry Development Board (CIDB) data shows that in the period from January to October 2020, the value of construction project awarded dropped 42 percent to RM55.3 billion, compared to RM96.4 billion in the same period last year (CIDB Malaysia, 2020)

Conventional construction is one of the earliest techniques used in the construction industry which does not use production plant building materials or finished components[3] However, the authentic conventional construction method uses wooden moulds at construction sites. While IBS construction method which all the components are made in a controlled environment before transported, installed and assembled on the construction sites with minimal additional structures. The pandemic has shown that, due to low technology adoption, the construction industry depends too much on unskilled foreign labor[4]. Technology such as industrialized building systems, mechanization, and automation must be embraced by construction industry players to increase the efficiency, safety, durability, and productivity of their construction projects during facing this pandemic. This study focused on the effect of the Covid-19 pandemic on the construction industry. This study also focuses on the level of awareness of Covid-19 prevention measures and compare the effect of the Covid-19 pandemic to the Conventional and Industrialised Building System project at the construction site.

2. Literature Review

The Malaysian construction industry was supposed to rebound this year before the Covid-19, but with the situation deteriorating, the industry is set to contract by 8.8 percent in 2020. It will be more intense, according to his report, only contractors registered as G1-G4 with the CIDB (Construction Industry Development Board) are permitted to resume on-site work, while G5-G7 contractors are excluded from this exemption [5]. The conventional construction system is generally divided into two primary components and mostly made of reinforced concrete beams. The structural system, which includes cast-in-situ columns, beams, slabs, and frames [6] The installation of timber formworks and scaffoldings, the placement of steel bars, the pouring of fresh concrete into the formwork, the dismantling of formwork and scaffoldings are the steps in the construction of these frames [3]. The pandemic offers a possibility for the economy to develop structurally. IBS refers to a factory's strategy of making construction materials and then installing them on-site construction [7]. The concerns of availability of customer options, shorter construction times, greater product quality, employment prospects for local and unnecessary dependency on foreign labor would all be addressed simultaneously. To ensure smooth construction, the uses of drones to monitor construction progress on-site need to be extended and improved, other without engineers on site. Drones fitted with loudspeaker systems are now frequently used to monitoring communities to comply with Covid-19 public safety orders.

During this pandemic Covid-19, CIDB has issued several prevention measures to control the Covid-19 from spreading in site construction. Construction companies that are restarting activities must give information and guarantee compliance with all SOP accessible at the CIDB and National Security Council (MKN) [2]. All foreign construction workers in Selangor, as well as the Federal Territories of Kuala Lumpur and Putrajaya, must be tested by swap test for Covid-19. However, those who applied but yet to undergo the Covid-19 test or who are waiting for the test results, are permitted to continue to work while they wait for their turn to be tested [8]. Several clusters of Covid-19 have been reported among foreign employees that living quarters, including one among security officers working at a mall in Cheras and another case among construction workers in Setia Alam [9]. Taking care of foreign employees is important and foremost compassionate in a world torn by the Covid-19. Enhanced worker effectiveness and production, as well as improved cleanliness on the majority of locations. It has helped in minimizing project problems caused by other COVID-19 effects. It has helped in minimizing project challenges caused by other COVID-19 effects, such as a reduced labor and material supply issues [10].

More time is spent preparing work tasks, and frontline workers are typically deployed in smaller groups than normal, with trades working systematically rather than side by side. This has resulted in enhanced worker effectiveness and production, as well as improved cleanliness on the majority of locations[11]. It has helped in minimizing project problems caused by other COVID-19 effects. It has helped in minimizing project challenges caused by other COVID-19 effects, such as a reduced labor and material supply issues. Maintaining these ways of functioning may result in long-term benefits[10]. Some contractors, subcontractors, suppliers, and labor sources may be unaffected for the time being because they have not been instructed to close or because they are considered "critical" for government work [12].

3. Methodology

The data for this study was collected by using two approaches. The first method was pilot test with five selected experts from the construction industry sector to allow them to share and express their insight and opinion on the current state of the construction industry in this pandemic. In addition, the experts were asked to share the impact of the pandemic on the construction industry. The questionnaire was conducted via google form platform due to the restriction of the Movement Control Order (MCO) in this pandemic. The second method is quantitative data by associating construction experts to assess the level of awareness of Covid-19 prevention measures and comparison the effect of the Covid-19 pandemic to the Conventional and Industrialised Building System project at site construction.

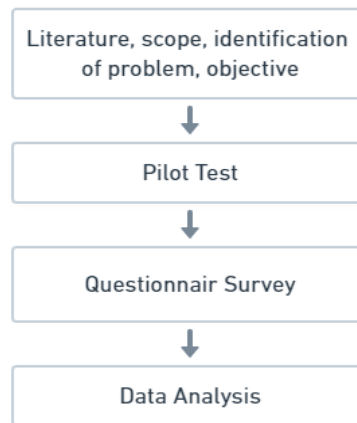


Figure 1: Methodology chart

3.1 Data Collection

For data collection, the researcher using secondary data sources which are journals, articles, and books to identify the assess the level of awareness of Covid-19 prevention measures and comparison the effect of the Covid-19 pandemic to the Conventional and Industrialised Building System project at site construction. Several factors that can influence the awareness of Covid-19 prevention measures in a construction site were identified and were used to develop primary data which is using a questionnaire for the purpose to support and achieve Objective 1 and Objective 2.

3.2 Questionnaire

This study used an online questionnaire. The questionnaire consisted of close-ended questions with two type of five-point of Likert scale which is agreement and frequency. Agreement five-point Likert scale (e.g. 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree) and frequency five-point Likert scale (e.g. 1 = never, 2 = rarely, 3 = occasionally, 4 = frequently, and 5 = very frequently). This questionnaire consists of 3 part which is Part A (respondent's background), Part B (awareness level of Covid-19 pandemic), and Part C (comparison the effect of the Covid-19 pandemic to the Conventional and Industrialised Building System project at site construction).

3.3 Data Analysis

The collected data from the questionnaire will be computed into Statistical Package for the Social Science (SPSS) and Microsoft Excel program by using descriptive statistics such as means and standard deviation. The data for the results of the study will be generated by using the Average Index (AI) that computes the strength of indices of agreement and frequency.

$$\text{Mean Index} = \frac{\sum a_i x_i}{\sum x_i} \text{ (eq.1)}$$

a_i	Constant that represents the weight of the i
x_i	The variable that represents the frequency of response for i
i	= 0,1, 2, 3
X_1	The frequency of the response "Strongly agree" to a1
X_2	The frequency of the response "Yes" to a2
X_3	The frequency of response "Less Agree" to a3
X_4	The frequency of response "Disagree" to a4
X_x	The frequency of the response "Strongly Disagree" to a5

4. Result and Discussion

This section presents the demographics of respondents. Table 1 shows the demographic data of organizations, which includes the type of, the category of organization, size of the project the company has undertaken, qualification, and years of experience.

From the result for question 3 and 4, the highest frequency is 26 out of 50 respondent choose to acknowledge their worker and follow SOP during work to minimize the virus spread in the construction site. The mean value for this question is 4.46 and 4.38 respectively. As stated [9] it is not only humane but also sensible to look after foreign employees in Malaysia. First, because foreign employees are crucial to Malaysia's economy. Second, ignored the welfare of foreign workers during this pandemic had severe public health and economic consequences for the country.

Based on the result questionnaire for questions 5, 6, and 7, most respondents answered strongly agreed with scores (25, 31, and 29) respectively. From the result, most construction sites provide sanitation stations in front of the main gate to minimize the virus spread among their work in the construction site. Other than that, the procedure for entering the construction site should be emphasized to ensure that all the workers follow SOP which is social distancing themselves from others. The mean value for question 5, 6, and 7 is 4.42, 4.58 and 4.50.

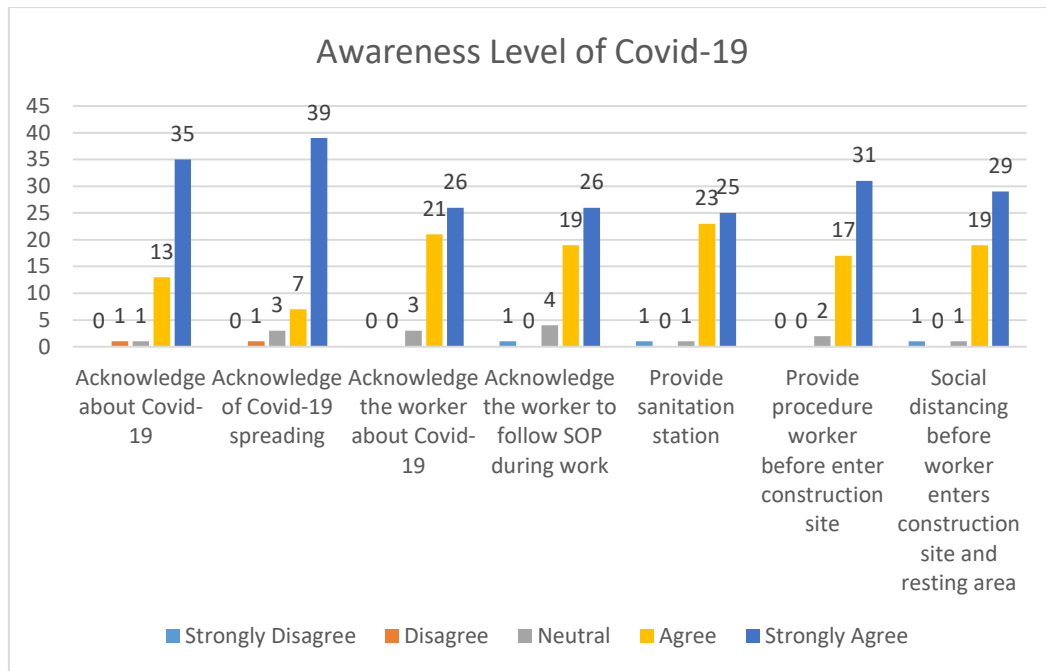


Figure 2: Awareness Level About Covid-19

Table 1: Assessment of Effect Industrialised Building System (IBS) and Conventional Method Due to Covid-19

Effect Due to Covid-19	Likert Scale					Total	AI
	1	2	3	4	5		
Most Affected Due Covid-19							
IBS Project Method	0	3	7	23	17	50	4.08
Conventional Project Method	0	1	5	17	27	50	4.4
Delay in Delivery Material							
IBS Project Method	0	4	7	18	21	50	4.12
Conventional Project Method	0	1	5	18	26	50	4.38
Manpower Shortage							
IBS Project Method	0	6	3	22	19	50	4.08
Conventional Project Method	0	1	5	18	26	50	4.38
Financial Difficulties							
IBS Project Method	0	2	8	18	22	50	4.2
Conventional Project Method	0	1	6	13	30	50	4.44

Table 1 presents the average index analysis and ranking of the most affected due to Covid-19 at the construction site. From the data obtained, it would be seen that item 2, which is the conventional project method scored the highest value (AI = 4.4) than the IBS project method with value (AI = 4.08). This result shown conventional project method most affected due the pandemic Covid-19. In addition, item

number 2 which is the conventional project method is the highest score with a value (AI=4.38) than the IBS project method. Material delays and supply shortages have occurred as a result of cross-state, the supplier company's activities being stopped during MCO and the increasing demand for supplies also increase after MCO that cause a delay in delivery material. Furthermore, conventional project method scored the highest value (AI=4.38) than the IBS project method with a score (AI=4.08). This result shows conventional project method required more manpower at the construction site than the IBS project method. The reason that the IBS project method least scored because building panels are manufacturing at the plant and install on the construction site using less manpower. Companies experienced a scarcity of skilled workers, the majority of which are foreign workers. Covid-19 caused many foreign workers to return to their home countries. Beside that's, conventional project method scored the highest value (AI=4.44) than the IBS project method with a score (AI=4.2). Financial difficulties also one of the reasons why the construction industry was affected due to the outbreak of Covid-19. Late payments, project cost increases, and limited projects were three issues that create economic issues during Covid-19. Some companies experienced a decline in profits due to a lack of projects. Due to a shortage of projects, the company's profitability declining. The industry also having issues with the government demanding late payments for government projects. As a result of these factors, companies unable to pay their staff salary.

5. Conclusion

The summarization of this study was made by looking at the achievement of the research objective through the analysis of research findings. The methodology in this research is the quantitative method, which had done by distributing the questionnaire through a google form. Besides that, the respondents were project managers, construction managers, engineers, site supervisors, safety site supervisors, and others. The research was conducted in the Kuala Lumpur construction project area. The first objective is to determine the awareness of Covid-19 prevention measures at the construction site while the second objective is to compare the effect of pandemic Covid-19 between an Industrialised Building System project and Conventional project construction.

Acknowledgement

The author would also like to thank the Faculty Civil Engineering and Built Environment, Universiti Tun Hussein Onn Malaysia for its support.

References

- [1] H. C. Yashavantha Rao and C. Jayabaskaran, "The emergence of a novel coronavirus (SARS-CoV-2) disease and their neuroinvasive propensity may affect in COVID-19 patients," *J. Med. Virol.*, vol. 92, no. 7, pp. 786–790, 2020,
- [2] C. Malaysia, "CIDB SOP.pdf." CIDB Malaysia, 2020.
- [3] M. A. Othuman Mydin, N. M. Sani, and A. F. Phius, "Investigation of industrialised building system performance in comparison to conventional construction method," *MATEC Web Conf.*, vol. 10, pp. 1–6, 2014,
- [4] M. Nyathi, S. Taylor, and C. Gerwel Proches, "The Impact of COVID-19 on Project Managers in the Construction Industry," no. July, 2020, doi: 10.13140/RG.2.2.30407.11686.
- [5] Ar. Ng Yean Shiunn, "What is the impact of COVID-19 on Malaysia's construction industry & what can be done? - iproperty.com.my," *National House Buyers Association*, 2020.
- [6] Y. Y. Al-Ashmori *et al.*, "BIM benefits and its influence on the BIM implementation in

- Malaysia,” *Ain Shams Eng. J.*, vol. 11, no. 4, pp. 1013–1019, 2020
- [7] W. Al-Aghbari, “Factors Affecting Construction Speed of Industrialized Building System in Malaysia Wa’ El Abdumoghni Mohammed Al-Aghbari .,” *Master Thesis*, 2005.
- [8] N. F. Andhini, “Leadership in the time of Pandemic,” *J. Chem. Inf. Model.*, vol. 53, no. 9, pp. 1689–1699, 2020.
- [9] T. Theng Theng, M. N. Nazihah, and J. R. Khalidi, “Covid-19: We Must Protect Foreign Workers,” no. June, pp. 1–37, 2020,
- [10] W. Jones, V. Chow, and A. Gibb, “Covid-19 and construction: Early lessons for a new normal?,” *Loughbrgh. Univ.*, no. August, pp. 1–18, 2020.
- [11] R. F. Pasco, S. J. Fox, S. C. Johnston, M. Pignone, and L. A. Meyers, “Estimated Association of Construction Work With Risks of COVID-19 Infection and Hospitalization in Texas,” *JAMA Netw. Open*, vol. 3, no. 10, p. e2026373, 2020
- [12] A. Alsharif, S. Banerjee, S. M. J. Uddin, A. Albert, and E. Jaselskis, “Early impacts of the COVID-19 pandemic on the United States construction industry,” *Int. J. Environ. Res. Public Health*, vol. 18, no. 4, pp. 1–21, 2021
- [13] R. Shi and J. W. McLarty, “Descriptive statistics,” *Ann. Allergy, Asthma Immunol.*, vol. 103, no. 4 SUPPL., pp. 60–63, 2009