

# **Implementing COVID-19 Standard Operation Procedure (SOP) in Malaysia Construction Industry: Challenges and Strategies**

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## **Abstract**

The COVID-19 disease has impacted the performance of all industries, including the construction industry. In order to curb the spread of the disease, the government has conducted Movement Control Order (MCO). Consequently, a construction project is not allowed to be operated unless the implementation of the new SOP aims to curb the spread of COVID-19 disease among workers on the construction site. The operation of the construction site has resulted in new clusters of COVID-19 in the early phase of the outbreak which led to the project shut down. The objective of this study is to identify the challenges of implementation of SOP during the outbreak of COVID-19 from the contractor's perspective and to suggest a solution for controlling the effects of the COVID-19 outbreak at the construction site. In collecting data and responses from the respondents, interviews were held through the telephone conversation and video conferencing with nine (9) contractors in Cheras, Kuala Lumpur. The selection was made through the purposive sampling technique in which the contractors were selected from the contractor listing on the Malaysian Construction Industry Development Board (CIDB) website. Content analysis is used to identify the main challenges. Results from interviews found four (4) challenges faced by contractors and five (5) solutions for mitigating the effect of an outbreak. The challenges include wearing face masks, maintaining social distancing, securing authority approval letter, and restriction of workers' numbers. On the other hand, the solutions that are highlighted include proper planning and scheduling, complying with COVID-19 standard operating procedures (SOP), controlling the movement of workers, providing all workers' vaccination, and conducting regular COVID-19 tests. These findings have shown that having SOP for COVID-19 has posed challenges to the activities on the construction sites. As such, the findings intend to increase the awareness among construction companies on the challenges towards the implementation of the best practices to overcome these challenges.

Keywords: Construction Industry, COVID-19 Pandemic, Movement Control Order (MCO), Standard Operating Procedure (SOP)

## **1.0 INTRODUCTION**

The construction industry is one of the primary sources of economics and growth in a country. The building operations are crucial to the fulfillment of a country's socio-economic development goals. It serves a vital function in ensuring people's safety and comfort. At the same time, construction is among the sector that offers many jobs as well as one that contributes to the nation's GDP (Haupt & Harinarain, 2016). It contributes between 3% and 5% of the overall economic GDP over the previous two decades through government and private projects, facilities, maintenance, housing project, infrastructure and other projects (Khan et al., 2014). Other sectors also contribute to the GDP such as agriculture and services that

have forward-looking links, while production and mining, are autonomous from the causality of construction. The economy of Malaysia is evolving towards sustainable manufacturing, with a greater focus on buildings. Other countries can use the result as a standard for achieving sustainable development (Alaloul, et al., 2020). It has been observed that the construction sector performance can be affected due to many factors which in turn can also affect the whole GDP performance of a country. One of them is an unseen event like the COVID-19 outbreak that can significantly affect the performance of the overall GDP as well as the contributing sectors.

The COVID-19 disease that was firstly discovered in China has shocked the whole world. The disease spread through contact (WHO, 2020). It received full attention from the World Health Organization (WHO) and affected every country in every aspect. Touching contaminated surfaces or items of COVID-19 can be spread when the eyes, nose and mouth are touched and a person might be affected thereafter. Contact with infected surfaces or items may spread COVID 19. The survival of the COVID-19 virus on surfaces is uncertain. However, it appears to have behaved similarly to other coronaviruses. Studies show that coronaviruses may stay on surfaces for several hours or up to several days, even in the case of a COVID-19 virus.

According to UNHAS (2020) infection of the COVID-19 virus is commonly seen through respiratory symptoms, fever, cough, shortness of breath, and difficulty breathing. More severely, pneumonia, severe acute respiratory syndrome, renal failure, and death may be caused by infection. However, there is also an infection that does not shows any symptoms. Because of the absence of symptoms throughout the incubation period and the fast propagation of the virus, COVID-19 instances can be anticipated to grow within nations impacted.

In Malaysia, it can be seen that the total GDP collapsed due to the impact of COVID-19. The impact of COVID-19 on the construction industry is seen when Malaysia's GDP increased by 3.6% in the fourth quarter of 2019. In the first quarter of 2020, the Prime Minister revealed that a lot of the industries collapsed due to the lockdown including the construction sector. The scenario was worsened by the extension of the COVID-19 epidemic in the second quarter of 2020, with individuals being compelled to remain indoors. It is therefore evident that the construction industry's stoppage represents a serious threat to stability due to the suspension of the construction sector (Alaloul et al., 2020).

The COVID-19 outbreak affects social, economic, and country development. For the purpose of this study, the scope covers how COVID-19 affected the construction project majorly in every aspect including the SOP at the construction site. It has been noted that COVID-19 SOP is required so that the practices at construction projects continue without getting stop-work orders from the government (Rahim et al., 2020). Implementation of the COVID-19 SOP at a construction site does not only involve the labour but also involves the party that is related to the construction project. This includes contractors, architects, clients, guards, engineers, and stakeholders of the project as they can either be directly or indirectly involved. This situation also means that every single worker involved with the construction site must be also willing to participate and follow the new rule for safety and health. At the same time, the stakeholders and management team involved in planning and scheduling must know how to implement the new SOP at the construction site and ensure workers at the construction site also practice the COVID-19 SOP. The SOP consists of practicing a minimum physical distance of one meter from other workers, avoiding any physical greetings with other workers, workers need to work according to sequences designated as well as prepare, and use hand sanitizer regularly and sanitise toilet regularly according to the timetable (CIDB, 2020).

There has been limited research on the impact of COVID-19 on the construction industry in Malaysia. Most of the previous research with respect to construction has focused on endemic and pandemic cases that include dengue, SARS, malaria and others (Liang et al., 2018; Lim, 2009; WHO, 2011). As there are several cases of COVID-19 that have emerged among construction workers, the difficulties of adopting the latest SOP at the construction site are seen. According to Salim (2020) in Nur Afifah Muhd Radzi (2021), the construction site spans Cheras, Titiwangsa and Lembah Pantai in Kuala Lumpur, has the highest number of infections reported on 5 December 2020 with 162 cases when the

construction was permitted by the authority. Other challenges of implementing the COVID-19 SOP include the compliance in which a total of 6,923 construction sites complied with the COVID-19 SOP while 781 construction sites did not comply with the COVID-19 SOP and were given stop-work order for not complying with the COVID-19 SOP (Rahim *et al.*, 2020).

It is important to manage the challenges faced by the contractors in implementing the COVID-19 SOP. According to Amoah & Simpeh (2021), the challenges of implementing the COVID-19 SOP imply that the construction worker could not be effectively protected against contracting COVID-19 owing to the problems in applying COVID-19 safety measures. The site workers can be infected at the locations of the project and transmit it to their families and vice versa, which could have additional effects on the community through the societal spread of the disease. According to Hatoum *et al.* (2021) due to the challenges faced by the construction workforce and with the restart of the operations of construction projects, it is necessary to assess the health and safety risks associated with coronavirus and how the new safety measures can support workplaces.

The main task for the site manager at the construction site is to address the challenges of implementing COVID-19 SOP as the inability to resolve would entail further issues such as loss of workforce, labour wages and the decline in the use of construction materials (Harun & Razak, 2020). With the aim of the study of reducing the number of cases from the construction site, two objectives have been identified for this study. The first objective is to identify the challenges of implementation of SOP during the outbreak of COVID-19 from the contractor's perspective; the second objective is to recommend a solution in controlling the effects of COVID-19 outbreak at the construction site.

## **2.0 LITERATURE REVIEW**

Health and safety in construction are particularly essential because the sector is vulnerable and often deadly. Health and safety can be divided into six (6) categories of safety hazards which are safety hazards, physical hazards, chemical hazards, biological hazards, ergonomic hazards, and work organization hazards (OSHA, 2018). Wolf *et al.* (2018) estimated that over 1.2 million fatalities were worldwide related to occupational hazards in 2015, accounting for 2.1 percent of all deaths in the population as a whole. The proportion of the total burden of illness in the general population attributable to employment is 2.7 percent when it comes to fatalities and disabilities. 70% of the overall work-related burden of illnesses is contributed by non-communicable diseases, 22% by injuries and 8% by infectious diseases.

Infectious disease cannot be ignored as it is very dangerous to human being because it can cause death. There are a few infectious diseases that are commonly related to the construction industry which are malaria, dengue, SARS, and COVID-19 (Lim, 2009). According to Shiva *et al.* (2016), some types of mosquitoes tend to increasingly breed on construction sites. Construction workers frequently stay on building sites, which makes them particularly vulnerable to malaria. WHO stated that every year there will be over 200 million cases of malaria that occur worldwide (WHO, 2011). In addition, the greatest dengue epidemic that was reported in Singapore in 2013 and 2014 was also known to be 22,077 (seven fatalities) and 18,318 (five fatalities) confirmed cases respectively. Due to its combination with the biggest dengue clusters in both years, mosquitos reproducing at construction sites was probably a risk factor (Liang *et al.*, 2018).

The risk and how dangerous COVID-19 is also not much different from all the infectious diseases mentioned above. According to Weinfass (2020), over 360 construction workers died from coronavirus between 9 March and 25 May 2020 in London. The COVID-19 disease that is firstly discovered in China has shocked the whole world. The disease spread through contact (WHO, 2020). It received full attention from the World Health Organization (WHO) and affected every country in every aspect. According to UNHAS (2020) infection of the COVID-19 virus is commonly seen through respiratory symptoms, fever, cough, shortness of breath and difficulty breathing. More severely, pneumonia, severe acute respiratory syndrome, renal failure, and death may be caused by infection.

Due to how dangerous COVID-19 disease is, the construction site is required to follow COVID-19 Standard Operation Procedure (SOP) to protect workers in the construction site from the infection (Rahim *et al.*, 2020). In Malaysia, the Construction Industry Development Board (CIDB) has in place the SOP to be adhered to for construction sites.

## **2.1 Standard Operating Procedure (SOP)**

SOP can be defined as a procedure document that defines in detail how an operator should conduct a certain operation. SOPs include the operational intent, the necessary equipment, and supplies, which the step is set up and operated, the worker performs maintenance and stops operating, a synopsis of safety concerns, and problems, a list of replacement parts, illustrations, and checklists. The SOP is one of several process papers necessary to operate a given process consistently with other documents including process flow charts, and material requirements (Akyar, 2012).

According to Bergerova (2010), SOP should be the best method known to the organisation and should be used as step-by-step job directions on sites. There are a few advantages of standardisation (Bergerova, 2010) and they include; i) Accurate instrument for transferring information, ii) Effective coordination method, iii) Simplification, iv) best practice

SOP aims to ensure all employees do the same duties, which is necessary to ensure that the desired output of the process is obtained. If all employees continually execute their jobs, controlled experiments may be carried out to assess the impact of altering process parameters (Akyar, 2012). According to Esa *et al.* (2020) the most important positive consequence of a project's success is the compliance of COVID-19 SOP in construction sites. This is because the compliance of COVID-19 SOP in the construction site can help the project to be operated without termination by the authority. Hence, it is important to properly define SOP and its function to have a better understanding of SOP and the implementation of SOP can be further improved. Improvement of implementation and conducting SOP in the construction site can give a good impact on the management of the construction site.

## **2.2 Challengers of Implementing COVID-19 SOP in Construction Site**

Covid-19 SOP is a new SOP produced by authority and CIDB. According to Ab Rani *et al.* (2020), it is a new norm in the aftermath of a crisis when it differs from the pre-crisis position. Hence, the implementation of a new SOP poses a challenge as it has never been practiced in the construction industry before the occurrence of COVID-19 outbreak. This situation is discerning when stop-work orders have been issued to some construction companies in Malaysia due to non-compliance with COVID-19 SOP (Rahim *et al.*, 2020).

However, according to Bailey *et al.* (2020), not all construction projects need to shut down as all projects are different from each other, and some do not need to have close proximity in executing the work while the SOP is in place. Thus, there is no challenge in conducting a new SOP to create a safe working environment.

Esa *et al.* (2020) in their study has observed that the COVID-19 SOP limit the number of workers on construction site through the practice of social distancing which in turn gave a huge effect on the project's progress as well as the productivity of workers. Moreover, according to Chopra (2020), construction work at the site was unable to be conducted as it involves physical distancing which led to the inability to complete and the possibility of the project shutting down. The same situation is mentioned by Hatoum *et al.* (2021) who have observed that the situation has led employers to take action on conducting new safety measures to prevent the workers from infection by the virus. The new measures followed the advice and guidance of several health and safety bodies, such as the Occupational Safety and Health Administration (OSHA) as well.

Among the effects of the challenges of the pandemic on construction projects include the delay

in the delivery of construction materials due to lockdown, delay in completion of construction projects due to lockdown and the implementation of other safety measures and social distancing (Shibani *et al.* (2020). The study by Amoah & Simpeh (2021) found that there are numerous challenges faced at construction sites which include the ignorance of COVID-19, the delivery of underperforming personal protective equipment to entrepreneurs, inadequate compliance, sanitisation, difficulties in sharing instruments and equipment, the use of workers' public transport, superstitions, compliance with rules on social dissociation and others. These problems have therefore hindered its efforts to properly comply with the safety measures under the COVID-19 safety standard.

According to Azlan *et al.* (2020) in Malaysian society, the usage of face masks is not the norm. It is unusual to wear a facial mask if a typical Malaysian is unwell. In their findings, the majority of respondents took a good view of how COVID-19 was controlled (83.1%), Malaysia's ability to fight the illness (95.9%), and how the Malaysian authorities dealt with the issue (89.9%). In the week leading up to motion control, most respondents also took care to prevent crowds (83.4%) and practice adequate manual hygiene (87.8%). The use of facial masks was nonetheless effective. Thus, wearing a face mask is one of the new norm challenges for Malaysians. Other challenges that the construction companies faced in order to maintain social distancing include the order to control risks, work schedules, and staggered practice & sequence of employees while, at the same time, building a home-based work system for the non-site team conducting remote meetings (Ab Rani *et al.*, 2020). According to Choi & Staley (2021) the compliance of SOP in construction sites had posed the possibility of confusion to occur regarding the use of PPE. It is not unforeseen that the number of COVID-19 cases among the workers increased with the occurrence of confusion that is combined with other conflicts and issues which include social distancing, barriers to work, workers with COVID-19 contact came to construction sites and symptomatic workers.

Based on finding in research by Hatoum *et al.* (2021) the challenges faced by the construction workforce are: i) Tested positive workers continued to come to work, ii) Exposed workers to the virus continued to come to work, iii) Employers have not practiced social separation, iv) Employers did not supply masks or PPE like gloves and face shields, v) No manual washing facilities or hand wash washers were provided by employers, vi) Employers have not taken safeguards against contracting for the virus, as established by the health and safety authorities or by the State's local policies, vii) No disinfecting or deep cleaning of workplaces by employers, viii) Despite the mask regulations, employees didn't wear facial cover

However, according to research by Wang *et al.* (2020), the other challenges that are faced in construction sites during COVID-19 outbreak are workers' availability, site accessibility, building material shortages and insufficient control of epidemics caused by the lock-out strategy.

Table 1 presents a summary of literature in terms of the challenges of COVID-19 faced by the construction industry as highlighted by several authors. In summary, the majority of challenges posed by COVID-19 are related to problems of the availability of manpower and unclear practice of SOP on site. The challenges posed as a major hindrance to success on ongoing projects.

Table 1. Summary of Identified Challenges Highlighted by Authors

Authors	Identified Challenges
Esa <i>et al.</i> (2020)	1. Limitation of number of workers 2. Social distance
Chopra (2020)	Social distance
Shibani <i>et al.</i> (2020)	1. Safety measures 2. Social distance
Amoah & Simpeh (2021)	1. Ignorance of COVID-19 2. Delivery of underperforming personal protective equipment to entrepreneurs, 3. Inadequate compliance, 4. Sanitisation, 5. Difficulties in sharing instruments and equipment,

	6. Use of workers' public transport, 7. Superstitions, 8. Compliance with rules on social dissociation
Azlan <i>et al.</i> (2020)	Wearing face mask
Ab Rani <i>et al.</i> (2020)	Modify the numbers of the building firms in order to meet the social distances.
Choi & Staley (2021)	1. Confusion about the use of PPE 2. Social distancing 3. Barriers to works 4. Workers with COVID-19 contact and symptomatic workers came to construction site
Hatoum <i>et al.</i> (2021)	1. Tested positive worker continued to come to work 2. Exposed workers to the virus continued to come to work 3. Employers have not practiced social separation 4. Employers did not supply masks or PPE like gloves and face shields. 5. No manual washing facilities or hand wash washers were provided by employers 6. Employers have not taken safeguards against contracting for the virus, as established by the health and safety authorities or by the State's local policies 7. No disinfecting or deep cleaning of workplaces by employers 8. Despite the mask regulations, employees didn't wear facial cover
Wang <i>et al.</i> (2020)	1. Workers' availability, 2. Site accessibility, 3. Building material shortages 4. Insufficient control of epidemics
King <i>et al.</i> (2021)	1. Unclear SOP guidelines from the authority 2. Workforce management the SOP.
Stiles <i>et al.</i> (2021)	1. Unclear practical application of SOP 2. Difficulties of individual or supplier to understand differences in working arrangements on sites. 3. Limitation of number of workers 4. Delay of getting approval of permits from the authority

### 3.0 RESEARCH METHODOLOGY

This study uses a qualitative approach to identify the challenges of implementing COVID-19 SOP on the construction site. Semi-structured interview questions were posed to potential respondents that were identified through purposive sampling. This type of interview gives chances for both researchers and respondents to discuss certain topics in more detail. In the qualitative method, the interviews require careful consideration and preparation. The interview should be fairly informal. Qualitative research data was handled by several steps which include recording, filing notes, the transcription process, and analysing the data. The transcription process used in this research was made manually by the researcher and content analysis was used to analyse the data in this study. Content analysis is the process of categorising verbal or behavioral data which includes classifying data and coding. The analysis will be done through two (2) levels which are the descriptive level and interpretative level.

#### 3.1 Research Design

The research design is the general approach used to integrate the components of the study consistently and logically. It is guaranteeing that the research topic is addressed successfully, and represents the blueprint for data collecting, measurement, and analytics (Sileyew, 2019). This study employed a qualitative research method. The section of interview questions is divided into the following: a. Section A: General Information of Respondent; b. Section B: Details of respondent's current project; c. Section C: Challenges of COVID-19 SOP in construction site; d. Section D: Impacts of COVID-19 SOP on the construction site; e. Section E: Solution to mitigate the effect of COVID-19 outbreak on the construction site.

Hence, this study employs a descriptive research design to determine the challenges of implementing COVID-19 SOP in construction sites for the selected type of construction organisation. Descriptive research portrays an accurate profile of persons, events, or situations. This design offers to the researchers a profile of described relevant aspects of the phenomena of interest from an individual, organizational, and industry-oriented perspective (Creswell 2013).

### **3.2 Sampling Technique**

The study population consisted of construction industry employees in Cheras area of Kuala Lumpur city. To select respondents from this type of industry population, purposive sampling has been considered. The population of data was drawn from Grade 4 and Grade 5 contractor companies which consisted of a few categories of work such as B04 (Building construction work) category and CE01 (road construction and pavement), CE02 (construction of bridges and jetties), CE06 (drainage, and flood control structures) and CE10 (pile work). The total population in this study is around 2500 companies (CIDB report). The sample was drawn from groups of contractors who did building works at the construction site. The target sample of respondents in this research is fifteen (15) respondents. According to Dworkin (2012) many studies offer sufficient guidance that the respondents can be from 5 to 50 respondents. In order to choose respondents to take part in the study, purposeful sampling was utilised in which the relevant contractors were selected in accordance with the criteria from the CIDB list.

### **3.3 Data Analysis**

Traditional content analysis is used as an inductive method in this qualitative investigation. The method for the subjective evaluation of text data content by systematically classifying codes and finding themes or patterns is the conventional content analysis. Content analysis may be utilised as a tool for all sorts of written texts, independent of the collection of research data. Furthermore, this type of study substantially helps to provide a deeper understanding of human perceptions and experiences. The data was transcribed manually by the researcher using Microsoft Word. The responses of respondents to the questions asked during the interview sessions were presented in a table format and the analysis of the data was made through the verbatim quotation of the respondents.

### **3.4 Study Area**

This study was conducted on construction sites in Jalan Cheras, Kuala Lumpur. Kuala Lumpur was one of the construction sites that has the highest construction work done in terms of value specifically in the third quarter of 2020 which is between April and June. This duration is also the period in which construction sites are allowed to operate during the outbreak with permissions and instructions from the authority. Moreover, this area is now active in the development of new construction projects. The type of project chosen for this study is limited to only building and civil engineering works only. According to Salim (2020) construction site in Cheras, Titiwangsa and Lembah Pantai, Kuala Lumpur, has the highest number of infections reported in December 2020 with 162 cases.

## **4.0 RESULTS AND DISCUSSION**

Respondents' experiences and feedback added insight to the research questions posed in this study. In this study, the two research questions are addressed with the responses to the interview questions and quotations of feedback from the respondents.

### **4.1 Demographic of respondents**

The results of this qualitative study are based on interviews of eight (8) contractors from seven (7) companies of the same state and district and different grades of construction companies as shown in Table 2.

Table 2: Respondents' Profile

Respondent	Gender	Position in Project	Type of Project	Education Level	Experience	Workers' numbers at site
R1	Female	Quantity Surveyor	Infrastructure	Degree	2	20-25
R2	Female	Quantity Surveyor	Building	Degree	2	25-20
R3	Female	Quantity Surveyor	Building	Degree	2	15-20
R4	Male	Project Manager	Building	Diploma	5	15-20
R5	Male	Project Manager	Infrastructure	Degree	3	25-30
R6	Female	Site Manager	Infrastructure	Degree	3	15-20
R7	Male	Project Manager	Building	Master	2	20-25
R8	Male	Site Manager	Infrastructure	Degree	1	25-30
R9	Female	Site Engineer	Infrastructure	Degree	1	30-35

#### 4.2 Challenges of Implementing COVID-19 SOP: Development of theme

There are four (4) distinct themes and nine (9) sub-themes that can be identified from the research data as shown in Table 3.

Table 3: Categorized Theme and Sub-theme

Research Question	Theme	Sub-theme	Codes	
Challenges of implementing COVID-19 SOP in Construction Site	Challenges with workers' sop compliance	Wearing mask	Workers difficult to wear masks all the time on site under hot sunny weather (4)	
		Maintaining social distancing		
Solution for Mitigating the Effect of COVID-19 outbreak in Site	Challenges with management of work schedule on site	Approval of MITI	Workers difficult to work far away from each other (4)	
		Restriction Number of workers		
Solution for Mitigating the Effect of COVID-19 outbreak in Site	Improve site/project management	Planning and scheduling of project	- properly allocate works/tasks (4)	
		Comply with COVID-19 SOP	- divide workers into small groups (3)	
			- Wear mask (4)	
	Improve workers' welfare			- Sanitise regularly (2)
		Movement of workers	- provide temporary housing for workers (3)	
			- workers bring their own food instead of dining outside (1)	
	Vaccination	- provide vaccine to all workers (2)		
	COVID-19 Test	- conduct swab test to all workers regularly (4)		

Themes 1 and 2 answered the first research question; What is the contractor's perspective on the challenges of implementation of Standard Operation Procedure during the outbreak of COVID-19? Themes 3 and 4 addressed the second research question; What is the new solution for controlling the effects of COVID-19 outbreak at the construction sites? In more depth, each topic is covered below.

##### 4.2.1 Theme 1: Compliance with workers' SOP

###### a. Wearing Face Mask

Some contractors mentioned that wearing face masks is a major challenge for the workers on site to comply due to the weather. Wearing a face mask can be difficult for any person when it comes to a certain type of weather. It can cause a person to feel uncomfortable, suffocated and so on. Moreover, workers on construction sites need to deal with the work they do. The heavier the work is, the more difficulties that will be faced by the workers. This situation also brings difficulties for the contractor to



manage the situation and workers' behaviour on the construction site. This is in line with Azlan et al. (2020) that the use of face masks is nonetheless less prevalent. It is considered one of the new norms and gives challenges to Malaysians. Hatoum et al. (2021) also stated that even though there are regulations about the wearing of face masks, there still got workers that do not wear face masks. The respondent's explanation regarding wearing a face mask as a challenge in the construction project is as shown below in Table 4.

Table 4: Respondents' Quotes on Challenges of Wearing Face Mask

Respondent	Respondents' quotes on challenges of wearing face mask
R6	“Workers need to wear face masks under hot sunny day. That is the most challenging SOP to comply”
R3	“It is difficult for the workers to do construction work while wearing the face mask all the time”
R9	“Wearing face masks under certain weather can be difficult for the workers.”
R5	“There are also some workers who do not comply with the SOP. But the situation of workers not complying with the rules from contractor is a normal thing happening on construction sites. It depends depending on how the contractor manages the situation. If that happens, we will advise the workers strictly to comply with the prescribed SOP”

**b. Maintain Social Distancing**

Maintaining social distancing is not possible in all situations in construction work. Maintaining social distancing is a brand-new unique type of challenge that is faced by both contractors and workers. This challenge is also mentioned by some the researchers such as Harun & Razak (2020) and Ab Rani et al. (2020) that social distance is one of the challenges. Esa et al. (2020) stated that the project's progress and the productivity of the workers are greatly affected by maintaining social distancing. Chopra (2020) and Shibani et al. (2020) said that site works were not able to be conducted in such distancing where it is impossible to make on-time delivery. Although it is difficult to maintain social distancing, contractor always tries their best to keep the workers maintain it. This is because, if COVID-19 SOP is not being practiced on construction sites, it can lead to warnings from the authority or CIDB. In addition, maintaining social distancing is also a challenge when it comes to daily site meetings. The respondent's explanation regarding the challenges of social distancing is shown below in Table 5.

However, according to one of the respondents, the challenges of implementing the COVID-19 SOP were challenging in the beginning when it was implemented i.e., during the early stages of COVID-19 outbreak. However, as time goes by, the workers are becoming more accustomed to doing so. But there are still workers that find it difficult to conduct the new SOP.

For that reason, there are two probabilities that can be predicted by the researcher. The new and old workers recruited may feel unfamiliar with performing the new COVID-19 SOP and the challenge of each job is different depending on the type of task. Some types of work on the construction site are fine with practicing new SOP such as wearing a face mask and maintaining social distancing. While some other types of work find it difficult to be operated while conducting the new COVID-19 SOP at the same time. This is in line with the findings by Bailey et al. (2020). Authority may not give an unnecessary order for any construction project to shut down because all projects are different from each other, and some do not need a physically close to one another (Table 5).

Table 5: Respondents' Responses to Challenges of Social Distancing

Respondent	Respondents' quotes on maintaining social distance challenges
R7	“It is impossible for workers to practice social distancing when it comes to certain types of work on construction site. Some works need the workers to do it together and sometimes workers are closed to each other without intentions and do not realize it.”
R5	“It is hard for the workers to practice social distancing at times due to the work situation.”

R8	“Although it seems impossible to maintain social distancing, but social distancing is important as we as contractors and workers are also afraid to get infected by the virus COVID-19.”
R4	“It may be difficult to maintain projects while keeping in compliance with the rules on health and safety for social distance. Construction site must be opened and actively managed to avoid more expensive delays.”
R2	“When the outbreak of COVID-19 happens, it is difficult for us to conduct site meetings daily. We need to consider the number of workers that can gather and need to consider the social distancing. There are also some of the workers who take advantage on not attending the site meeting.”

#### 4.2.2 Theme 2: Management of Scheduling of Site

##### a. Approval of Ministry of International Trade and Industry (MITI)

From the interview session with the respondents, it can be noted that complying with MITI requirements is one of the challenges that need to be conducted or fulfilled. The failure to gain approval from MITI can affect the progress of work on the construction site. Workers cannot enter the construction site as they need to show their MITI letter at the entrance of the site. However, this difficulty is quite the same as what was stated by Stiles et al. (2021) during the outbreak, it was difficult to get a permit from the authority as the officer may work-from home factor. The respondent’s explanation regarding difficulties in getting MITI approval letter is shown below in Table 6.

Table 6: Respondents’ Responses to the Approval of MITI Challenges

Respondent	Respondents’ quotes on approval of MITI challenges
R2	“One of the challenges faced by us is MITI letter. This is because some of the workers do not have the MITI approval letter. They cannot enter the site to do the construction works.”  “There was a time when I apply the MITI approval letter for two types of my company which is G4 and G5. For the G4 company, the MITI letter was easily get approved by authority while the other one took a long time to get approved.”  “So, sometimes you need to try to apply the MITI letter a few times. So, it is quite time-consuming for the project to be run smoothly and accordingly to the scheduling we made.”
R1	“There are some workers where MITI letters are not approved.”
R3	“MITI approval letter is important in the construction site. If a worker fails to show his MITI approval letter during the inspection by the authority or CIDB, the construction site can be subjected to action. We do not want that to happen as it can affect the timeline of the project.”

##### b. Restriction of Workers’ Number

Restriction of the workers’ number is one of the COVID-19 SOP is also one of the challenges faced by contractors. This is agreed by Esa et al. (2020) that a limited number of workers in construction give a huge impact on the project’s progress and productivity of workers. Furthermore, the restricted number of workers on the construction site affects the timeline of the project. The respondent’s explanations regarding challenges in restriction of workers’ number are as shown below in Table 7.

Table 7: Respondents’ Responses to Restriction of Workers’ Number Challenges

Respondent	Respondents’ quotes on the restriction of workers’ number challenges
R3	“During the outbreak, we need to reduce the number of workers on site according to the phase of the state. For Phase 1, there can be only 60% of the whole workers can attend

	the site to conduct the construction works. For phase 2, only 30% of the whole workers' number allowed to be on site."
R5	"Only 60% of workers allowed in the construction site. Some works such as lifting heavy objects are difficult to be performed by the little number of workers. Besides that, the work was supposed to be finished in one day, but due to the restriction of workers' number in site, the works took days to finish."
R4	"Some of the works need to get done by a few numbers of people. And now, during the outbreak, we always face an insufficient number of workers."
R8	"It is not that the work cannot be finished at all by the lesser number of workers, it is just that, the work gets more difficult compared to the situation where the number of workers is more."

### 4.2.3 Theme 3: Improve Site/Project Management

#### a. Planning and Scheduling of Project

Planning and scheduling as mentioned by the respondents include the management of the schedule for each worker and the number of workers on site. Proper planning and scheduling can help contractors to achieve the goals of each day on the construction site. It also ensures the efficiency and productivity of the workers on site. The respondent's explanation regarding proper planning and scheduling of the project is as shown below in Table 8.

Table 8: Respondents' Responses on Solution - Planning and Scheduling of Project

Respondent	Respondents' quotes on solution - planning and scheduling of project
R2	"As we faced the issue of difficulties in conducting site meetings, we decided to divide the workers into small groups. This really helps us to conduct site meetings according to the SOP."
R4	"Grouping the workers into small groups is what we are currently doing to overcome the challenges."
R7	"The way we manage challenges is by managing the work schedule of all employees so that all employees can work according to schedule, and no employee will be laid off."
R5	"Dividing the workers into a few small groups does not mean the challenges are gone. It just helps to mitigate the effect and help to overcome it a little bit."
R6	"The effect of COVID-19 outbreak in construction site can be mitigated by reducing workers at each phase of construction. This is because, by doing so, we can close the chain of transmission of the COVID-19 virus among the workers on construction site."

#### b. Comply with COVID-19 SOP

One of the ways to mitigate the effect of COVID-19 on construction sites is by complying with COVID-19 SOP as shown in Table 9. This is in line with Esa et al. (2020) where the most important positive consequence of a project's success is the compliance of COVID-19 SOP on the construction site. By complying to the COVID-19 SOP in a construction site can help the project to be operated without termination by the authority. It is also supported by other previous research such as by Hatoum et al. (2021) which stated that most construction companies take action by conducting the new SOP and safety measures that are in line with the SOP set by the government in order to reduce the effect of COVID-19 outbreak. There are also other companies that take initiative to conduct more than the SOP set by authority in order to protect their workers from being infected and leading to another impact such as delay. The respondent's explanation regarding complying with COVID-19 SOP is as shown below in Table 9.

Table 9: Respondents' Responses on Solution – Comply to COVID -19 SOP

Respondent	Respondents' quotes on solution – Comply to COVID -19 SOP
R1	“One of the ways to mitigate the effect of COVID-19 is by complying to the SOP. Make sure to follow the SOP seriously.”
R8	“Always put a face mask on and sanitize the construction site frequently to avoid the spread of the virus.”
R9	“Remember to always minimise contact or close distance between workers.”
R7	“Complying to COVID-19 SOP is the answer to everything so far in the current situation of COVID-19 outbreak.” “Stop-work order is worse than the challenges.” “My construction site has once received a warning from the authority and CIDB.” “Then, our site was given warning of 1 week suspension. We need to close our site for 1 week duration. That situation taught us a lesson. After that situation, we conduct our SOP seriously. We do not want the same thing to happen.”
R2	“I have experienced once when the CIDB came to our site. They suddenly came without any notice so that they can see our real behaviour on construction site. But everything was okay. No stop-work order or warning from them.”
R1	“The day when the CIDB came, we have one mistake which is we had more number or workers than we should have which is not more than 60% of workers.”
R5	“We carried out the construction very well according to the prescribed SOP. So, when CIDB came to make an inspection, we did not receive any warning letter from them.”

#### 4.2.4 Theme 4: Improve Workers' Welfare Management

##### a. Movement of Workers

One of the respondents also shared that her construction site allowed its workers to go out of site for lunch. She also shared that the best way to control the workers is to provide the workers with accommodation inside the site. Furthermore, contractors may reduce the risk of exposure to infection by monitoring the movement of workers. These findings are in line with the opinion stated by Esa et al. (2020) where management of break hour and management of workers' residential are among those SOP that is important to protect the workers from getting infected by virus. The respondent's explanation regarding the control movement of workers is shown below in Table 10.

Table 10: Respondents' Quotes on Solution – Movement of Workers

Respondent	Respondents' quotes on solution – Movement of Workers
R1	“Workers move in and out during the working time. For example, during break hours, the workers will go out of the site to search for food stall or restaurants to buy their lunch. “The more they went out, the more they get exposed to uncertain risk.”
R2	“I think it is better for workers on my construction site to bring their own food from home. That way, they do not have to wander around out of the site to search for lunch. It is safer to stay inside the construction site.” “Project management should provide workers' accommodation inside construction site. This can greatly save a lot of costs. If workers stay inside the site, we do not have to do the COVID-19 test regularly which is quite costly. Workers also cannot go anywhere which may expose them to risk. We can provide them canteen where they do not have to go outside any longer to search for food. Besides that, we can save more time during the entrance of the site.”

##### b. Vaccination

As shown in Table 11, Respondents 7 and 3 reported during the interview session that they think that every worker should complete their dose of vaccination to mitigate the effect of COVID-19 outbreak

on the construction site. By providing vaccination to all workers, herd immunity can be achieved inside construction sites which can reduce more risk of infection with the COVID-19 virus. (WHO) (2020) and Choi & Staley (2021) also mentioned that vaccination is one of the ways to protect workers. The respondent's explanation regarding workers' vaccination is shown below in Table 11.

Table 11: Respondents' Responses to the Solution – Vaccination

Respondent	Respondents' quotes on the solution – Vaccination
R7	"I personally think that we must ensure that all of the workers are vaccinated."
R3	"Company should take own initiative to hold a vaccination program for workers under the company itself and register it at the government. Vaccination give a lot of advantages to the construction industry."

### c. COVID-19 Test

When respondents reported that regularly conducting COVID-19 test is a good action, it was assumed that conduct can create a safe working environment on the construction site due to their experience during the outbreak. When workers comply with COVID-19 SOP before entering the site, it can reduce the infection risk and the spread of the virus in the construction site as any infected workers can be detected earlier before entering the construction site. If workers do not conduct their COVID-19 test at least once per two weeks, there will be possibilities of the presence of infected workers as the workers themselves do not know whether they are infected or not. Four respondents specifically indicated that they currently do the COVID-19 test for their workers as shown in Table 12.

Table 12: Respondents' Responses to Solution – COVID-19 Test

Respondent	Respondents' quotes on the solution – COVID-19 test
R4	"Always conduct COVID-19 test to all workers at least once a week."
R7	"Make sure to conduct COVID-19 test according to the scheduling."
R9	"Before entering the construction site, make sure you do the COVID-19 test,"

From this result, there are many challenges faced by the construction industry, especially at the construction site from the contractors' perspective.

### 4.3 Solution to Control the Effects of COVID-19 Outbreak at the Construction Site

The next analysis of the responses focuses on the control of the effect of COVID-19 outbreak on construction sites. Respondents used the terms "COVID-19 test" and "swab test" interchangeably during the interviews. When respondents reported that regular conduct of the COVID-19 test is a good action, it was assumed that they meant that doing COVID-19 test regularly can create a safe working environment in construction sites due to their experience during the outbreak. Four respondents specifically indicated that they currently do the COVID-19 test for their workers as shown in Table 13.

Table 13: Respondents' Responses to Solution – COVID-19 Test

Respondent	Respondents' quotes on the solution – COVID-19 test
R4	"Always conduct COVID-19 test to all workers at least once a week."
R7	"Make sure to conduct COVID-19 test according to the scheduling,"
R9	"Before entering the construction site, make sure you do the COVID-19 test,"

According to the above analysis of data, it can be concluded that it is proven that contractors do face several challenges in implementing COVID-19 SOP on the construction site. In addition to the challenges that have been identified earlier, this research has identified a new trend of solution through the conduct of regular COVID-19 tests on workers. Based on all responses of respondents, it is recommended that all those management staffs on the construction site such as safety and health manager,

project manager, site manager, and other related position be strict with all workers. It is also recommended that construction firm owners develop new strategies as well as penalise workers that do not want to comply with the SOP (Amoah & Simpeh, 2021). The findings also revealed several solutions for mitigating the effect of COVID-19 outbreak on site which include the control of the movement of workers, vaccination and COVID-19 Test among the workers.

## 5.0 CONCLUSION

The findings of this research have proved that contractors faced challenges in implementing COVID-19 SOP on construction sites. Nonetheless, contractors have been struggling to comply with the SOP to reduce the effect of the outbreak on construction sites. The study has revealed some of the challenges faced by contractors in implementing the new COVID-19 SOP on the construction site which include the wearing of face masks, maintaining social distancing, and challenges restricting the number of workers. Furthermore, this study has identified new challenges as a result of the emergence of the COVID-19 pandemic. The most challenging aspect in adhering to the new SOP challenges is the grant of MITI letter to operate. It is also revealed the common solution to mitigate the effect of the COVID-19 outbreak at the construction site include proper management as well as compliance to COVID-19 SOP, control of the movement of workers, and the provision of vaccination to all workers. The study also found that compliance with SOP is the best solution to enable construction companies to practice in order to avoid further effects such as project shutdown.

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