

Strengthening the Development of Safety and Health Guidelines During Post-Covid-19 Condition for Construction Site Project

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Abstract

COVID-19 has had a significant impact on the construction industry, and it is critical that the economy recovers quickly after COVID-19. Construction project jobsite safety and health, as well as timely project delivery, must be strictly always adhered to. The aim of this research is to identify the understanding, acceptance, and feasibility of the new safety and health guidelines application, as well as to determine the level of knowledge in the senior management of a construction company about the new performance safety and health guidelines due to the COVID-19 pandemic condition, by examining the new safety and health application guidance for the post-COVID-19 situation in the project jobsite. The questionnaire survey (quantitative approach) was distributed to construction sites in Klang Valley. Stratified random sampling was used to obtain data from Grade 7 contractor companies. A total of 140 questionnaires were distributed, with 50 received and analysed using descriptive and frequency analysis, as well as the Relative Importance Index (RII). As a result, the most significant new safety and health guidelines applications in construction sites are the implementation of health screening procedures, the establishment of a recording logbook, and temperature screening at the entry point using a touchless thermometer. One of the most significant aspects of the new safety and health guidelines application's acceptance and feasibility is the routine cleaning and disinfection of commonly touched surfaces, site offices, and labour dormitories every two hours, four times a day. Lastly, the top management and superiors are encouraged to have individual discussions with employees about the precautions and considerations for those with health problems returning to work, as well as precautions to make the workplace safe. This study complements and benefits clients, contractors, project managers, and other project participants by providing an understanding of the existing implementation of safety and health guidelines application during post-COVID-19 conditions for construction site projects.

Keywords: Safety and Health Guidelines, Post-Covid-19, Construction Site Project

1. Introduction

Following the COVID-19 pandemic, most construction projects were halted in order to prevent the pandemic from spreading further. Construction work has been severely impacted by the crisis; therefore, the construction industry must play a role in protecting the construction workers, their families, and society at large when

construction projects resume work after a period of closure (Bailey, 2020).

Construction projects should enforce all health and safety procedures on their construction sites, including but not limited to sanitary protocols, proper hygiene, social distancing, the use of personal protective equipment (PPE), toolbox talks on special COVID-19 requirements, a system for tracking workers' health status (e.g. MySejahtera Apps), regular COVID-19 testing, housing labourers on the same worksite, and prompt reporting of health issues related to COVID-19 by all construction members on the project sites (OSHA, 2020; Kaskutas, Jaegers, Dale & Evanof, 2016).

Currently, the Construction Industry Development Board (CIDB) requires project site employers to establish a system to implement Safe Management Measures in order to provide a safe working environment and reduce the risk of future outbreaks. These measures include implementing a detailed monitoring plan to ensure compliance with Safe Management Measures, in which construction organisations will appoint Safe Management Officers to assist in the implementation, coordination, and monitoring of the system of Safe Management Measures at the workplace, reducing physical interaction and ensuring safe distancing at workplaces, supporting contract tracing requirements, requiring PPE and observing good personal hygiene, ensuring the cleanliness of workplace premises, and implementing health checks and protocols to manage potential cases (CIDB, 2020).

In recent months, most states' construction sites have remained open because construction was deemed essential, and projects were exempted from government orders to close businesses. Essentially, all construction job sites contribute to the national economy's continued growth. State and local governments in jurisdictions that halted construction operations a year ago are now relaxing those restrictions and allowing construction to resume (Sobolewski, 2020).

According to the previous update on 15th May 2020, CIDB declared that from 20th April to 18th May 2020, 515 (11%) of Malaysian construction sites successfully complied with the Standard Operating Procedure (SOP), while 167 (4%) were non-compliant (issued warning notice and ordered to be closed). Besides, 3,870 (85%) of construction sites had yet to resume their project at the time. In addition, based on CIDB Telegram Channel on 22nd June 2020, the number of operating construction sites increased to 2245 (84%), while 437 (16%) construction sites were issued warning notices and 19 (1%) construction sites were ordered to close due to SOP non-compliance. This scenario proved that there was a high level of awareness among construction industry players about the SOP imposed by the government, as well as an increase in the project's success in meeting the SOP.

In the post-COVID-19 era, minimising the spread of the virus has become a top priority on construction sites. This can be especially difficult on construction site projects because field workers, by definition, cannot work from home and must often work in very close proximity to others. A comprehensive study is required to understand the new safety and health guidelines on the feasibility of jobsite practices and to gain a better understanding of the practical implications. Therefore, the aim of this research is to identify the understanding, acceptance, and feasibility of the new safety and health guidelines application, as well as to determine the level of knowledge in the senior management of a construction company about the new performance safety and health guidelines due to the COVID-19 pandemic condition.

1.1. The Impact of COVID-19 on the Construction Industry

Following the COVID-19 pandemic, many construction industry businesses remained stable, with little negative impact. Some project sites are working double shifts to complete advance work and meet deadlines before any additional restrictions are imposed. The current situation in the construction industry market has shown no sign or heard of any significant defaults in progress payment or cancellation of contracts in jobsite progress in the current post-COVID-19 situation (Yadeta & Pandey, 2020).

Major supply vendor and supply chain shortages have not yet reached crisis proportions, with only minor shortages notifications issued. It is dependent on how quickly supply from Europe and China can be maintained (Alsharef, Banerjee, Uddin, Albert & Jaselskis, 2021). Cash flow is critical to maintaining workforces in construction, as it is in other industry sectors, and construction businesses are planning for different scenarios in the short and medium term, including reduction of expenditure for controllable costs, restructuring, and shortened working weeks (Bailey, 2020).

At this point, based on *Surat Arahan PKPR Bil. 26/2026*, the Malaysia Public Work Department has issued an addendum to the Public Work Department Standard Form of Contract that includes the pandemic and epidemic clauses. Because the contract provisions have been enacted, issues concerning time extensions will be required in order to avoid contract penalties and liquidated damages as a result of pandemic and endemic conditions. Construction key players anticipate that force majeure claims will be prominent, and they hope that banks and government agencies will assist suppliers and customers during this post-COVID-19 pandemic situation (Bailey, 2020; Alsharef et al., 2021). In addition, the construction sector will also take a pragmatic approach to deal with contractual terms; however, this will require the entire construction supply chain system to behave in this manner (Yadeta & Pandey, 2020). Table 1 summarises a review of the literature on the implications of COVID-19 on the construction industry.

Table 1. The Impact of COVID-19 on the Construction Industry

No.	Implications	Author
1	Working double shifts to meet advance work and deadlines	Muneera et al. (2020); Yadeta & Pandey (2020); Kumar & Choudhury (2020).
2	Heavy defaults on progress payments or contract terminations in jobsite growth	Muneera et al. (2020); Yadeta & Pandey (2020).
3	Main supply chain and vendor supply shortages	Muneera et al. (2020); Alsharef et al. (2021);
4	Construction projects will be completely halted as a result of COVID-19 infection among site personnel	Bailey (2020); Rayan & Islam (2021). Muneera et al. (2020); Yadeta & Pandey (2020); Alsharef et al. (2021).
5	Stakeholders will have to step up and take the initiative	Rayan & Islam (2021); Muneera et al. (2020)
6	Workforce survival and construction business survival	Rayan & Islam (2021); Muneera et al. (2020); Kumar & Choudhury (2020).
7	Contractual clauses and contractual disputes	Muneera et al. (2020); Yadeta & Pandey (2020); Public Work Department (2021).
8	Control of cash flow	Bailey (2020); Muneera et al. (2020).

1.2. The New Health and Safety Guidelines

Construction industry in Malaysia is required to establish and implement new health and safety programmes to protect employees from COVID-19 and, more importantly, to prevent the deadly virus from spreading further (Ministry of International Trade and Industry Malaysia, 2020). This new Ministry of Health guideline will be led by the safety and health department of construction sites.

The guidelines include steps for construction employers to update the programme, as well as information on worker educational training for preventing the spread of COVID-19 on construction sites. The obligatory Standard Operating Procedure (SOP) in most construction sites workplaces for the post-COVID-19 situations in the nation are such as trained employees on COVID-19 awareness, intensified disinfection and cleaning, increased social distancing, ensuring good hygiene practices, implementing safe work practices, and the procedure on what to do with workers who may be sick with COVID-19 (Malaysian National Security Council, 2020).

The safety and health department of the construction jobsite must conduct weekly educational awareness exercises on COVID-19 latest updates in a system that is easily and conveniently understood by all construction workers. The content of the awareness should explain how COVID-19 spreads among employees, the symptoms of COVID-19, how to stop the spread of COVID-19 at the jobsite when the person is sick, and, most importantly, how an infected worker can transmit the disease to others even if they do not feel sick and no symptoms of COVID-19 appear to the construction workers. On the other hand, the safety and health officer must conduct frequent site walks or screenings to monitor everyone on the jobsite in order to maintain as much social distance as possible throughout the project (DOSH, 2020).

In addition, it is established to roll out the new safety and health guidelines application at the construction jobsite to aid in the prevention and control of COVID-19 by introducing more handwashing facilities and hand sanitiser stations that are readily available around the construction jobsite and encouraging all employees to use it. Employers should make an effort to understand changes in productivity expectations in order to provide additional time for employees to wash their hands frequently and thoroughly (Rayan & Islam, 2021). Table 2 summarises a literature review of the new health and safety guidelines in construction sites because of COVID-19.

Table 2. The New Health and Safety Guidelines

No.	Guidelines	Studied by
1	Educate employees on COVID-19 awareness.	
2	Introduce more handwashing stations on the jobsite.	Rayan & Islam (2021)
3	Clean and disinfect facilities on a regular basis.	
4	Stagger lunch times and spread out where employees spend their break time.	
5	Label or mark the floor or wall to maintain a one-metre separation.	CIDB (2020); Ministry of International Trade and Industry
6	Group the labourers that use the same equipment.	Malaysia (2020); Malaysian National Security Council
7	Limit the sharing of tools as much as possible.	(2020); DOSH (2020); Muneera, Ibrahim & Kamal (2020).
8	Implement health screening procedures at the jobsite's entry point.	
9	Set up a recording logbook.	
10	Temperature screening using a touchless thermometer at the entry point.	
11	Wear a face mask at all times while working on the construction jobsite.	
12	Provide single-use bottles instead of using shared water stations or dispensers.	
13	Provide hand sanitiser throughout work sites.	Rayan & Islam (2021)
14	Delivery drivers from time to time provide access to hand sanitiser.	Rayan & Islam (2021)

1.3. Awareness of Top Management in the Implementation of New Guidelines

The top management's responsibility for site safety is reinforced by several other provisions in the newly introduced guidelines or Standard Operating Procedure set out by the Ministry of Health Malaysia, which make it clear that regardless of the information provided by government agencies, the top management of construction sites must take proper precautions to ensure the safe performance of the work that will spread COVID-19. The

government will not have control, charge, or responsibility for the construction means, methods, techniques, sequence, or procedure, or for the safety precautions and programmes related to preventing COVID-19 infection on the jobsite; this is solely the right and responsibility of top management and the employer under the contract documents (Bailey, 2020; Rayan & Islam, 2021).

Steps to prevent the spread of the virus on jobsites, like all new safety efforts introduced to combat the COVID-19 pandemic, will only be successful with the full encouragement and cooperation of construction leadership at all levels (Sobolewski, 2020). Jobsite observations are more important than ever, and an investment in additional safety personnel on construction sites will protect both workers and their families in the post-COVID-19 situation.

Top management and the employer of the construction site must implement a zero-tolerance policy for working while sick and encourage sick workers to stay at home and self-quarantine. All supervisors and safety personnel on the jobsite should be on the lookout for COVID-19 symptoms such as fever, coughing, and shortness of breath. Making a COVID-19 observation form available for daily completion will also help to formalise this process (Rayan & Islam, 2021).

Top management in the construction industry is expected to respond quickly to any advice or notices issued by Malaysian enforcing authorities, and to do so within any timescales imposed by them. The vast majority of top management is accountable and will work with Malaysians to fight COVID-19 by collaborating with the government and government sector bodies to protect construction workers and the public (Sobolewski, 2020).

2. Methods

The research methodology used methodological approaches to investigate the new health and safety guidelines in the post-COVID-19 condition in the aforementioned construction site project. In this study, two methodological approaches were used: a literature review and a questionnaire survey. The questionnaire survey was created using the findings of a literature review. Stratified random sampling was used to obtain data from contractors' companies registered with the Construction Industry Board Malaysia (CIDB) Grade 7. The main contractor has the most labour force in the project and will be involved throughout the construction cycle, from start to finish, so the main contractor is the best element to participate in the research survey.

There are several stages to distributing a questionnaire survey form, including postal, mail/google form distribution, and direct walk-in distribution to the construction project jobsite for direct distribution to the main-contractor company. The G7 main contractor in the Klang Valley was divided into three states during this process: Selangor, Kuala Lumpur, and Putrajaya. Table 3 shows the survey methods and total responses received.

Table 3. The Methods of Survey Conducted and the Total Number of Responses Received

State	Postal	Mail/Google Form	Walk-in	Given	Return
Selangor	4	4	15	64	23
Kuala Lumpur	2	3	10	46	15
Putrajaya	1	3	8	30	12
Total				140	50

The questionnaire was divided into four sections: Section A: Respondent Background, Section B: Understanding of New Safety and Health Guidelines Application in Construction Sites Dealing with the COVID-19 Pandemic, Section C: The Feasibility and Acceptance of the New Approach as an Effective Solution to Previous Prescriptive Approaches in Construction Safety, and Section D: The Level of Knowledge of Construction Firms' Top Management Structure About New Performance Approach and Their Attitude Toward Its Implementation Within Their Organisations. The pilot study was carried out prior to the distribution of the actual questionnaire. A sample of the questionnaire was sent to expert reviewers from academia (1) and industry

(2) to be reviewed. The final amended questionnaire was used for the actual data collection (Creswell, 2018).

The Relative Importance Index (RII) is a technique for calculating the strength of index familiarity, frequency, and agreement of a specific question. The RII was used to rank the various factors that influence a successful construction organisation. This method transformed the five-point Likert scale to determine the ranking of each factor using the following expression (Tam et al., 2004):

$$RII = \frac{\sum_{i=1}^5 a_i x_i}{5 \times N} \quad (1)$$

Where a_i is a constant expressing the weight of the i th response, x_i is the frequency of the i th response of the total responses for each cause, i is the response category index where $i = 1, 2, 3, 4$ and 5 respectively, and N is the total number of respondents. The RII value ranges between 0 and 1 (Tam et al., 2004). The RII was calculated using this formula, and the values ranged from 0.2 to 1. The value 0.2 represented the least amount of strength, while the value 1 represented the most amount of strength. The mean response for the Relative Index (RI) was allocated as follows:

1. $0 \leq RI \leq 0.2$ Strongly Disagree
2. $0.3 \leq RI \leq 0.4$ Disagree
3. $0.5 \leq RI \leq 0.6$ Neutral
4. $0.7 \leq RI \leq 0.8$ Agree
5. $0.9 \leq RI \leq 1$ Strongly Agree

A total of 140 questionnaires were sent to and distributed throughout Klang Valley construction project sites. The total number of questionnaire survey form responses was 50, equating to a 36% response rate, which is acceptable when compared to other similar studies. These 50 questionnaire survey form responses also represented 20 main-contractor construction companies, and none were discarded from the analysis due to incomplete responses. The feedback from the questionnaire was used as the foundation for data collection and analysis, resulting in the achievement of the goals set (Sekaran, 2020).

3. Results and Discussion

3.1 Respondents' Background

Following the collection of Section A questionnaire data via the questionnaire survey, the data were analysed and discussed. Table 4 shows the percentage of the respondents' background positions in construction companies. Most questionnaires were distributed to the Director (4%), Project Manager (4%), Manager (11%), Quantity Surveyor (8%), HSE Officer (3%), Engineer (32%), Supervisor (18%) and Site Foreman (6%).

Table 4. Percentage of Respondents' Background Positions

No.	Position in the Company/Project	Frequency	Percentage (%)
1	Director	2	4
2	Project Manager	2	4
3	Manager	11	22
4	Quantity Surveyor	4	8
5	HSE Officer	3	6
6	Engineer	16	32
7	Site Foreman	3	6
8	Supervisor	9	18
	Total	50	100

On the other hand, Table 5 shows the percentage of respondents registered with CIDB under Grade G7 in Klang Valley, specifically Selangor, Kuala Lumpur, and Putrajaya. Selangor contractors received the most questionnaires, with 46%, followed by Kuala Lumpur contractors with 33%, and Putrajaya contractors with only 21%.

Table 5. Percentage of Respondents Registered with CIDB Under Grade G7 in Klang Valley

States	Questionnaire distributed	Returned questionnaire
Selangor	64	29 (46%)
Kuala Lumpur	46	15 (33%)
Putrajaya	30	6 (21%)
Total	140	50 (100%)

3.2 The Understanding of New Safety and Health Guidelines Application in Construction Sites Dealing with the COVID-19 Pandemic

These three new applications are the implementation of health screening procedures at the jobsite entrance point to make sure that workers reporting duty with a healthy temperature and without the symptoms of COVID-19 before entering the construction jobsite, the set-up of a recording logbook to store all employees' contact information prior to entering the jobsite for easy tracking, and temperature screening using a touchless thermometer at the entry point. The sum of these three RII is 0.968.

Table 6. Ranking of The New Safety and Health Guidelines Application in Construction Sites Dealing with COVID-19 Pandemic

No.	The new safety and health guidelines	Rank	RII
1	Implement health screening procedures at the jobsite entrance point.	1	0.968
2	Set up a recording logbook.	1	0.968
3	Temperature screening.	1	0.968
4	Educate employees on COVID-19 awareness.	2	0.944
5	Wear a face mask all the time on the construction jobsite.	3	0.928
6	Introduce more handwashing stations on the jobsite.	4	0.840
7	Frequently disinfect and clean the common area.	5	0.832
8	Label or mark the floor or wall.	6	0.824
9	Hand sanitiser must be provided throughout the jobsite.	7	0.816
10	Implement drinking water in single bottles rather than providing a shared water dispenser.	8	0.808
11	Delivery drivers from time to time provide access to hand sanitiser.	9	0.784
12	Rearrange the lunch time break and seating at the lunch table.	10	0.748
13	Group the labourers that used the same equipment.	11	0.708
14	Limit the sharing of tools as much as possible among construction workers.	11	0.708

These three new HSE applications had the greatest influence on the virus's success as one of the most effective new safety and health applications to implement at the construction jobsite as prescribed by all employees on the jobsite. Therefore, it is worthwhile to highlight that good entry point control and human body temperature tracking of construction workers are effective ways that should be considered (Versteeg, Bigelow, Dale & Chaurasia, 2020; WHO, 2020). The overall findings of this section have been summarised in Table 6.

Implement health screening procedures at the jobsite entrance point, setting up a recording logbook, and temperature screening are the three new HSE applications that have the highest rank among all new introduction applications to fight the virus during the post-COVID-19 situation, with a score of 0.968. On top of that, with

a score of 0.708, the majority of respondents agreed that the lowest rank of the new safety and health guidelines application in construction sites are group the labourers that use the same equipment and limit the sharing of tools as much as possible among construction workers.

The findings of this section were in line with the Site Operating Procedures Protecting Your Workforce During Coronavirus (COVID-19), which has been conducted by Construction Leadership Council (2020). This guideline emphasises which workers should or should not travel to work must follow the social distancing, self-isolation, and other precautionary measures for certain types of conditions. In addition, the guideline also considers a few conditions on-site access and egress points, hand washing practices, and procedure in using facilities and accommodation on site.

3.3. The Feasibility and Acceptance of the New Approach as an Effective Solution to Previous Prescriptive Approaches in Construction Safety to Face Post-COVID-19 Implications on Project Site

Based on Table 7, the majority of respondents from all jobsite positions agreed that employees should be educated on COVID-19 awareness during toolbox meetings or during newcomer safety inductions. It is also widely disagreed that educating an employee or newcomer on COVID-19 awareness in the daily toolbox meeting will cause difficulty to start daily work. With a RII value of 0.048, it is the most feasible and practical approach to be practiced on the jobsite, and it is believed to have the highest success rate in containing the virus on the construction site. Therefore, the construction leader on the jobsite should take note of the daily toolbox meeting agenda and the site safety induction syllabus in order to include awareness knowledge about COVID-19 during the post-condition at the jobsite (Kim et al., 2021).

Almost all respondents agreed that the most practical way to contain the virus would be to routinely clean and disinfect commonly touched surfaces, site offices, and labour dormitories every two hours, four times a day.

With a RII of 0.736, it is the most strongly agreed-upon such practice, and it is the most welcome method application to be adopted to contain the COVID-19 virus (Shiao, 2020; Kim et al., 2021).

Sharing of tools and equipment among construction workers must be limited or controlled to the greatest extent possible. This also seems feasible and practical to be practised on the project jobsite, with a RII of 0.644. Almost all employees believe that if sharing tools is unavoidable and unprevented, it is best to group workers in the same group to use the same tools together, as well as group workers who reside together or use the same transportation to work (Alsharif et al., 2021).

Table 7. Ranking of Feasibility and Acceptance of the New Approach

No.	The feasibility and acceptance of the new approach as an effective solution	Rank	RII
1	Routinely clean and disinfect commonly touched surfaces, site offices and labour dormitories every two hours, four times a day.	1	0.736
2	The construction equipment tools attempt to limit sharing. If tool sharing is unavoidable, the workers who share the equipment tools must be grouped according to where they live and how they travel.	2	0.644
3	Stagger lunch times into two sessions and distribute workers by providing additional seating and a shade area.	3	0.640
4	Label or mark every floor or wall in the working area to maintain a one-metre separation during working hours.	4	0.516
5	Introduce more handwashing stations on every floor and within a 10-metre radius.	5	0.300
6	Educate employees on COVID-19 awareness in every toolbox meeting.	6	0.048

3.4. The Level of Knowledge of Top Management Structure of Construction Firms About the New Performance Approach and Their Attitude Toward Its Implementation Within Their Organisations

Table 8 shows a list of the level of knowledge of the top management structure of construction firms about the new performance approach, and their attitude toward its implementation within their organisations. The highest recommendation is that top management provides full support and pledge full commitment to pushing the organisation to implement new safety and health applications that will anticipate effective success in containing the COVID-19 virus at construction jobsite in terms of financial and social obligations (Nawaz, Su, Barkat, Asghar, Asad, Basit, Iqbal, Zahoor & Shah, 2020). Therefore, a special fund allocation from the financial department and channeling it to the site health and safety department is necessary to ensure a smooth transition from the existing approach safety and health guidelines to the newly introduced safety and health application or Standard Operating Procedure (SOP). It will have a significant impact and efficacy in preventing COVID-19 from spreading further during the post-condition for the construction industry.

Table 8. Ranking of The Level of Knowledge of the Top Management Structure of Construction Firms About the New Performance Approach and Their Attitude Toward Its Implementation Within Their Organisations.

No.	The level of knowledge of the top management about the new performance approach	Rank	RII
1	Top management and superiors are encouraged to have individual discussions with employees about the precautions and considerations for those returning to work with health problems, as well as precautions to keep the workplace safe and COVID-19 secure.	1	0.888
2	Top management of construction industry is responsible for initiating, maintaining, and supervising all safety precautions and programmes in response to the COVID-19 pandemic.	2	0.884
3	Top management in the construction industry is expected to respond quickly to any advice or notices issued by enforcing authorities, and to do so within any timescales imposed by Malaysia enforcing authorities.	2	0.884
4	The employer of the construction project or the top management of the project shall be solely responsible for coordinating all portions of the work under the contract during the post-COVID-19 situation.	3	0.724

It is also important to recognise that top management in the construction industry plays a vital role in rolling out new safety and health applications on construction sites to prevent the virus COVID-19 from spreading further in the current post-condition. The new and additional safety application that will suit the current post-COVID-19 to apply will be unable to fulfill without the financial support and social commitment of top management (Nawaz, et al., 2020).

4. Conclusion

Despite the challenges of COVID-19 in the construction industries in order to maintain the low infection rate by implementing new safety applications introduced by authorities, there have been benefits for the safety, health, and environment sections in construction jobsites. The compulsory mindset to adapt to post-COVID-19 has generated a new custom of change readiness in the construction work cycle. The construction industry is under pressure to respond quickly to changes in health and safety in order to maintain dependability and complete projects on time. It is demonstrated by both top management and frontline staff to do something extraordinary when priority is given to health and safety. This experience may be useful for safety promotion in the future (National Security Council, 2020).

Furthermore, while the emphasis on health and safety topics is frequently on the safety aspect, health and hygiene are often overlooked (Jones, Gibb, Haslam, Dainty, 2019). COVID-19 has given the chance and an opportunity to the construction industry to emphasise the importance of more general hygiene practices as a major consideration for construction, which used to be less important in the eyes of construction project stakeholders. This may provide motivation to reconsider changing hygiene and health-related behaviour after the COVID-19 outbreak has passed (National Security Council, 2020; Kumar & Choudhury, 2020).

Directions for further research in strengthening and developing new safety and health guidelines application during the post-COVID-19 condition for construction site project can be seen in the following three areas, which can be extended to other types of workers' trade and contractors, extended to other states in Malaysia such as other high density cities like the states of Penang, Johor, or Perak, and can be extended to other stakeholders by reaching out to third party stakeholders such as local authorities or government agencies. By considering the management aspect, the context of this study can also be extended to the top management of construction companies.

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