Research in Management of Technology and Business Vol. 3 No. 1 (2022) 700-712

RMTB

Homepage: http://publisher.uthm.edu.my/periodicals/index.php/rmtb
e-ISSN : 2773-5044

Implementation of Industrial Hygiene on Construction Sites

Mat Idris Sahrom[1], Rozlin Zainal[1,2*], Narimah Kasim[1,2], Mohd Hilmi Izwan Abd Rahim[1,2]

[1] Department of Construction Management, Faculty of Technology Management and Business,
Universiti Tun Hussein Onn Malaysia (UTHM) Parit Raja, Batu Pahat Johor, 86400, MALAYSIA

[2] Centre of Excellence for Facilities Management (CeFM), Faculty of Technology Management and Business,
University Tun Hussein Onn Malaysia, 86400 Batu Pahat, Johor, MALAYSIA

*Corresponding Author Designation

DOI: https://doi.org/10.30880/rmtb.2022.03.01.050
Received 31 March 2022; Accepted 30 April 2022; Available online 25 June 2022

Abstract: Industrial hygiene is one of the important parts of construction sites as it be able to keep the sites healthy and safe. Nowadays, industrial hygiene is difficult to properly implement on construction sites because of the lack of awareness by employers and employees of keeping the sites healthy. As a result, this study aims to identify the problems associated with industrial hygiene on construction sites, identify solutions for the construction sites. The data for this study was gathered solely through a questionnaire. The respondents to this study are focused on 291 contractors G5 that was actively registered under CIDB in the Federal Territory of Kuala Lumpur. The questionnaire successfully collected only 152 respondents. Therefore, the response rate for this study is 66%. Descriptive statistic and crosstabs by SPSS software was used to analyse the data for all objectives. This research finds that the main problems of implementation that occur for industrial hygiene on the construction site for the workers is deplorable in living conditions and main strategies is improve workers' performance. The relationship proved that three main problems are deplorable in living conditions, inadequate storage system and lack of organisation cleanliness encouragement are related with the main strategies. The findings of this study will raise awareness among construction site employers and the government, contractors, and workers about the importance of maintaining healthy hygiene on the job site. Hopefully, the strategies for industrial hygiene problems on the construction sites could be taken instantly.

Keywords: Construction Sites, Facilities, Health & Safety, Industrial Hygiene

1. Introduction

**Corresponding author: rozlin@uthm.edu.my*

Industrial hygiene plays an important part other than focusing on a construction project. According to Zaini (2018), industrial hygienists use environmental analysis and analytical techniques to determine the level of worker exposure and to control possible health hazards through engineering. There are five components of industrial hygiene: anticipate, recognise, evaluate, prevent, and control. Top executives and management in Malaysia need to ensure the general welfare of people who work in their companies and their health (Mydin, 2016). It is important to ensure employees safety and health by preparing them to anticipate and identify risk factors and understand their workers impact on welfare given. According to Mydin (2016), whether the organisation has professional industrial hygiene on the on the construction site must recruit an outside organisation to inspect its facilities. This is to ensure that the facilities are well equipped and maintained well.

Several organizations and non-profit associations are engaged in protecting health training in Malaysia. The organizations are responsible for informing their clients about the importance of industrial hygiene and being aware of potential hazards in health facilities. For example, NIOSH (National Institute of Occupational Safety and Health) and MBAM (Master Builders Association of Malaysia) (JICA, 2018). If industrial hygiene is not being normalized on the construction site, it could lead to severe injuries to workers on the construction site. Safety officers' lack of knowledge and lack of awareness can cause workers to be in danger in terms of health and safety. Therefore, it is important to conduct a knowledge by health training expert to avoid any unhealthy environment (Kevin, 2012).

Construction sites in Malaysia have had the fifth-highest fatalities in March 2021. Accidents on construction sites may result in long-term physical injuries and health problems. The word ‘hygiene’ is described in this research study as ‘anything that has the potential to trigger illness or injury on construction site.’ (Silvia, 2014). The lack of knowledge and guidance caused a failure toward industrial hygiene to keep maintain on the construction sites and the effect can cause severe injury and health for the employees. The Ministry of Works has directed the Construction Industry Development Board (CIDB) to resolve issues concerning construction workers' on-site temporary housing, as these are significant sources of COVID-19 transmission in Malaysia (Kam, 2020). According to the Ministry of Health and the Ministry of Works, the majority of COVID-19 transmission occurs within overcrowded areas, particularly in Kuala Lumpur and Selangor. This has been exacerbated by the failure to follow Standard Operating Procedures (SOP). Furthermore, the lack of awareness is the main problem encountered by companies in complying with occupational health and safety laws regulations. Strict regulations and legislation are enforced to maintain the construction sites safe (Hatem, 2019).There are three research objectives that can be concluded to gain a legit data. And those research objectives are including to identify the problems of implementation that occur for industrial hygiene on the construction site for the workers and to identify the solutions for the problems of implementation hygiene on the construction site.

The research area is located in Kuala Lumpur. The Federal Territory of Kuala Lumpur is transforming into Malaysia's capital, with numerous high-rise buildings, highways, and service transportation (Pheng, 2019). The research explained the implementation of industrial hygiene on the construction site to ensure the company's contractors and developers follow the hygiene protocols and regulations on their workers.

The research scope focuses on contractors according to grade registered under CIDB. There are seven grades for each category, as shown in Table 1. A contractor is not permitted to perform any construction project that exceeds the value of the construction works implied in the registration grade. CIDB set the registration costs depending on the registration grade (Kamal, 2014). The grades are evaluated through a score by CIDB that measures health and safety environments.

Table 1: SCORE-CIDB for each grade (CIMS, 2021)

Grade	1 Star	2 Star	3 Star	4 Star	5 Star
G2	653	2485	430	0	0
G3	220	470	320	0	0
G4	538	380	210	0	0
G5	650	420	260	15	0
G6	18	103	122	0	0
G7	45	560	750	17	9

As for the score given, the grade that researcher selected is grade G5. The target respondents are contractors working for a G5 company. The researcher chose grade G5 because it was the highest grade than grade G2 and had the highest one-star score among the highest other mediums. According to The Star (2020), G5 grade companies have cases mainly with the welfare of their workers. The research scope was based on G5 company and the respondent chosen is a contractor.

The importance of the study is for the Ministry of Health Malaysia as it could provide more information to develop strategies and prevent disease outbreaks among workers. For top management of the company, improving themselves and updating their guidance to keep their workers in good hygiene would be beneficial. Moreover, a contractor could be more alert when the safety officer issues a follow-up order. Next, the research could help labour keep awareness of personal hygiene and follow the work protocol. Lastly, the academician could use this research to gain new knowledge or continue this study.

2. Literature Review

2.1 Hygiene on Construction Site

The research focuses on industrial hygiene on the construction site. Health and safety concerns are related to human, environmental, and economic matters (Eurostat, 2012). Health and safety problems are familiar across all aspects of industrial development and the regulations standards that manage construction sites. Construction sites are not kept clean during the construction phase because of a lack of awareness and knowledge about the effect. According to Wyatt (2013), ordering errors such as overestimation are factors that impact the site's condition. Materials that are not immediately used for building may cause a shortage of storage.

2.2 Importance of Site Hygiene

A construction project can run smoothly if the hygiene of workers is placed at the same level of importance as construction activities (Roth, 2014). Clearing up the construction site of trash and scraps could maintain a safe working environment on the construction site (Roth, 2014). A clean and tidy construction site leaves a positive impression and protects the contractor's reputation. They say that a clean and tidy construction site preserves its image (Watson, 2014). According to Bates (2015), if the work tools and supplies are not properly stacked in order, the tools could be relocated and missing. These unsystematic working environments produce a deficit and extend the entire project timeline.

2.3 Issues of Hygiene on Construction Site

The issues are the current problems of hygiene that workers are going through on construction sites. There are nine types of problems that occur on construction site.

(a) Inefficient Material Usage

According to Wyatt (2013), ordering errors such as overestimation are factors that impact the site's condition. Materials that are not immediately used for construction may cause insufficient space. When space is not enough, the materials are left dispersed over the construction site and cause missing material on the sites.

(b) Inadequate Storage System

According to Phu & Cho (2014), the material frequency influences the flow component that enables material movement and placement during the construction process. Consequently, management must take a systematic approach to control both in and out of construction materials throughout the project's duration. Otherwise, the construction site may encounter inventory issues.

(c) Ineffective Waste Management System

A good waste management system is required to maintain the construction site's cleanliness. However, hiring a waste management specialist comes at a cost. Collecting construction waste is important for waste materials, including soil and oil. According to Permana (2015), one of the reasons for poor building site waste management is a lack of inspection process and technology.

(d) Lack of Encouragement from Construction Organisation

According to Bukhari, Hassan & Ridzuan (2016), the organisation's senior management in Malaysia pays little attention to cleanliness on the construction site. The problems are never resolved if the organisation shows little to no commitment to managing construction waste. Therefore, it could indicate a lack of cleanliness on the construction site.

(e) Living Conditions Are Deplorable

Yee *et al.* (2017) have discovered Malaysia's dirty and dangerous living quarters, also known as 'Rumah Kongsi' for migrant construction workers. They stayed in a high-rise condominium in Klang Valley. They discovered that the workers lived in plywood quarters. The worst condition is that the quarters are crammed with 400 people, and some are sick.

(f) Risky with a Low Level of Security

According to Alias (2019), the 'Rumah Kongsi' provided at the 48-story Bangsar building project was constructed using flammable materials such as construction waste wood, with no roofs and thin walls. The location of the underground house is unsuitable, as it is two-storey above ground and has no exits.

(g) Constant Infections of Disease

According to a survey conducted by Berita Harian in Bandar Sri Sendayan, the workers' temporary house is built with more than 50 foreign workers in one house. As for results, it cause workers to be infections of disease. The environment is polluted due to trash and stagnant water in the immediate area, which may attract pests and serve as a breeding ground for Aedes (Alias, 2019).

(h) Irresponsible Employer

Developers prefer to have their workers live in a building that is still in the construction process since make it easier for developers to control the workers. It can save on transportation costs when the distance to work is only a few meters and ensures the workers can begin work on time (Alias, 2019).

(i) Inadequate Basic Facilities

Most temporary houses lack essential water, sanitation, and electricity. Most workers who stay in temporary housing are employees (Desai *et al.*, 2014). The worst-case scenario is that they are not provided with mattresses to sleep on, so they end up sleeping on the ground.

2.4 The Solution for Hygiene Problem at Construction Site

The solution is to overcome the current problems on construction sites. There are ten types of solution for this study.

(a) Employer Responsibilities

Employer responsibilities need to inform, train, and supervise employees on correct methods for utilising clean-up facilities and highlight the necessity of handwashing and hygienic conditions (Teng & Razak, 2017). The employer needs to ensure that all the workers follow the protocol and report hazards immediately.

(b) Supervisor Responsibilities

On behalf of the employer, the supervisor's responsibility is to ensure that construction projects have enough facilities and are properly maintained equipped with sanitised facilities (Teng & Razak, 2017). Ensuing, advising employees on the dangers of health and safety hazards, health risks, and infectious illnesses with lacking hygiene and toilet cleanliness.

(c) Worker Responsibilities

Worker responsibilities are ensuring that all safety practices are followed, and good personal hygiene is practised on construction sites. Workers need to report any unsafe conditions to their supervisor and warn other workers to avoid hazardous areas (Teng & Razak, 2017).

(d) Monitoring Programs

To reduce the worker's exposure to infectious illnesses when using toilets and hygienic facilities, the employer should ensure that they are ventilated, cleaned, and sanitised consistently (Teng & Razak, 2017). For example, records detailing the date and time when facilities need to be serviced.

(e) Hand Wash

Proper handwashing techniques are both effective ways to keep healthy. Handwashing is the best and most effective method of avoiding the spread of illness and may effectively reduce hazardous chemical exposures. Use soap and sanitiser frequently (Hasan, 2018).

(f) Drinking Water Potable

Developers must keep a sufficient supply of potable drinking water readily at the construction site (Hasan, 2018). Water for drinking need to be supplied by a piping system and clean, covered container with a drain faucet. A proper water system is ideal for keeping workers safe from diseases.

(g) Facilities for Eating

Building a separate room or area for food storage and providing a secure area to eat, drink, and smoke. Before entering the building room, workers should remove dirty clothing and wash their hands and other exposed skin. Developers should build eating facilities to prevent workers from re-entering the work area after changing their clothes and washing (Hasan, 2018).

(h) Removal of Equipment and Supplies

Equipment and supplies should be removed from work areas using proper cleaning methods and decontamination procedures using wet wiping and sealing plastic bags (Hasan, 2018). Workers must follow procedures to prevent dirt or hazardous materials from leaving construction areas.

(i) Employers Have a Practical and Cost-Effective Option.

According to the Minister of Works, the benefit of enforcing Centralized Labour Quarters (CLQ) is that the contractor has the right to choose well-equipped facilities for workers to minimize the cost (Borneo Post Online, 2018). The regulations should encourage small companies that cannot afford to build good accommodation for their employees. Regarding CLQ regulations, the developer can place the workers in CLQ because they are only charged at minimum rates.

(j) Improve the Performance of Construction Workers

Estelar & Baird (2012) believes that efficiency increases when developers keep workers healthy. It means an increase in efficiency so that productivity would be increased. The researcher can conclude that providing high-quality accommodations motivate employees to be more productive.

3. Research Methodology

3.1 Research Design

This research used quantitative methods. The respondent that requires the data to be collected is contractor G5 on construction sites in the Federal Territory of Kuala Lumpur. The questionnaire using a variety of question structures. Furthermore, the research used Statistical Package Science Social (SPSS) to evaluate frequency, mean and crosstabs to achieve all objectives.

3.2 Procedure Data Analysis

Questionnaires are the most common quantitative research methods. There are two types of resources in research, such as primary sources and secondary sources. Primary sources contain raw data and first evidence. Appendix 1 shows the procedure for the data analysis to be collected for the studies. In the first phase, the researcher needed to investigate the problems on construction sites. The findings were collected through the news and a journal.

The literature review investigates the main problems and the main solution on construction sites. The researcher collected literature reviews from books, articles, journals and other information within the study. The third phase of this research was collecting data to obtain an objective. The researcher's data was directly from respondents answering the questionnaire about hygiene on construction sites. The questionnaire conducted those three objectives in this study. The questionnaire was given to workers working on a construction site under grade G5 at Federal Territory Kuala Lumpur. 291 contractors G5 needed to achieve the quota for respondents.

The researcher analysed the data collected from the questionnaire. The respondents that needed to be collected was 291 contractors of G5, but the researcher only managed to get 152 contractors of grade G5. The questionnaire was distributed through email and WhatsApp. The researcher used Statistical Package Science Social (SPSS) to calculate the frequency and mean. Cross-tabulation was needed to identify the relationships between the main problems and the main strategies on construction sites. The researcher needed to include findings from the data analysis and proposed conclusion. The conclusion was based on the respondents' criteria after collected the data analysis findings through the mean and cross-tabulation.

3.3 Sampling

A population is a group of people from whom a statistical sample is taken for research. As a result, any collection of people who share a feature might be called a population. This research was being carried out by G5 active contractors registered with the CIDB in the Federal Territory of Kuala Lumpur. According to the Centralized Information Management System (CIMS, 2021), 1155 population sizes were registered under the Construction Industry Development Board (CIDB) for G5 contractors. Based on Krejcie and Morgan Schedule the sufficient sample size for a total population of 1200 is 291. A stratified random sample of 291 G5 contractors was chosen from Malaysia's 1200 active G5 contractors.

3.4 Research Methods

This research uses a quantitative method questionnaire as a method for collecting data (Refer Appendix A). The research objectives could be completed with the help of this data collection. The questionnaire design is based on a literature review methodology. The questionnaire in this research is divided into three (3) parts. Questionnaires are an effective data collecting tool when the researcher understands precisely what is needed and how to quantify the variables of interest. This study was divided into three sections: A, B, and C. Section A: Respondents Background, Section B Hygiene Issues on Construction Sites, and Section C: Hygiene Solution on Construction Site.

3.5 Pilot Study

The researchers made a pilot study based on the questionnaire draft and distributed the questionnaire through WhatsApp to reach the respondents. To make the pilot study achievable, the respondent had chosen 5 contractor grade G5 in Plentong, Johor Bahru to answer the questionnaire. The researcher objective is to make an easier question for respondents to answer. According to Kim & Cho (2015), the structure of the question should make it easier for the respondents to answer the questionnaire.

Reliability analysis needed Cronbach's Alpha to measure the reliability scale. Cronbach's alpha ranges from 0.0 to 1.0. The closer value to 1.0 indicates a greater internal with all the variability in test scores are reliable variance. In contrast, a value of 0.0 indicates no reliable variance. (Connelly, 2011). The result for reliability analysis is 0.947, as shown in Table 2 with the number of variables and the number of respondents.

Table 2: Reliability Test

Number of Variables	Number of Respondents	Cronbach's Alpha
61	5	0.947

3.6 Distribution of Questionnaire

Questionnaires that had already passed the reliability analysis was distributed through social media platforms such as WhatsApp and email. The researcher wrote a formal email letter to the construction company contractors. Then the contractors distributed it to their employees through WhatsApp.

3.7 Data Analysis

The researcher used The Statistical Package for Social Sciences (SPSS) to get an accurate final result to evaluate the frequency and mean for objectives 1 and 2. Crosstabs were used to find arelationship between the main problems and the main solutions for objectives 3. The analysis used in this research was the Likert Scale Questionnaire. The data are shown in a table and pie chart.

(a) Descriptive Analysis

Objective 1 and objective 2 used descriptive statistics to convey quantitative information in a manageable format. Descriptive statistics assist in simplifying the enormous importance of data. In this study, researchers used measures of central tendency to evaluate a mean for each objective.

(b) Likert Scale

The results collected through the Likert scale. The response options range from Strongly Agree to Strongly Disagree, allowing a researcher to view respondents' thoughts and level of agreement. All Likert scale survey questions contain a neutral response option for undecided people about the issue (Beglar, Ankur & Dinesh, 2013). The scale research determines the rate of hygiene implementation on construction sites. The level of hygiene can be divided into five scales: scale (1) Strongly Disagree, scale (2) Disagree, scale (3) Neither agree nor disagree, scale (4) Agree, and scale (5) Strongly Agree.

4. Results and Discussion

This study divided into three sections: A, B, and C. For every section, the questions are different based on respondents' information. The question achieved the three objectives: objective one, objective two, and objective three. Crosstabs were used to collect data from section C. The total number of respondents that the questionnaire should collect is 291 respondents. From 291 respondents, the questionnaire successfully collected only 152 respondents. Therefore, the response rate for this study is 52% which the normal response rate for the questionnaire within 45% (Pharm, 2008).

(a) Section A: Respondent's Background

The total of respondents that answer the questionnaire is 152 respondents in Kuala Lumpur. The qualification for those taken the questionnaire focuses on contractor Grade 5 in any buildings company. There are six types of question for this study.

Table 2: Frequency Analysis for Respondent's Background

No.	Respondent's Background	Frequency	Percentage (%)
1	Gender		
	Male	13	90
	Female	7	10
2	Race/Ethnicity		
	Malay	94	62
	Chinese	42	28
	Indian	16	11
	Others	0	0
3	Level of Experience		
	Less than 2 years	3	2
	2 – 5 years	61	40
	5 – 10 years	65	43
	More than 10 years	23	15
4	Project That Been Involved		
	Residual	106	69
	Institutional	31	20
	Commercial	15	10
	Others	0	0
5	Job Title		
	Project Manager	13	9
	Office Manager	24	16
	Safety Officer	57	38
	Resident Engineer	8	5
	Ste Engineer	46	30
	Others	4	3

6	Experience with OSH		
	Yes	152	100
	No	0	0

Based on Table 2, the percentage of the male respondent is higher than female respondents with a total percentage of 90% with a total of 94 respondents. The percentage for race and ethnicity for Malay is the highest, with 62% and 94 respondents. Furthermore, the level of experience for 5-10 years is the highest among the others with 43% and 65 respondents. Next, the highest percentage for a project that has been involved among the respondents is Residual with 69% and a total of 106 respondents. The majority of the respondents have been experiencing any health and safety casualties while working onsites.

(b) Section B: Problems of Implementation That Occur for Industrial Hygiene on Construction Site for Workers (Objective 1)

This section is divided into nine different problems as shown on Table 3.

Table 3: Mean Analysis for Problem of Implementation

No	Problems	Mean	Consent Level	Ranking
1	Inefficient Material Usage	4.5592	Strongly Agree	4
	• Poor allocation space	4.5855	Strongly Agree	1
	• Left dispersed over the construction site	4.5592	Strongly Agree	2
	• Poor material handling	4.5329	Strongly Agree	3
2	Inadequate Storage System	4.5636	Strongly Agree	2
	• Unsystematic material movement	4.5658	Strongly Agree	2
	• Unsystematic material placement	4.5658	Strongly Agree	1
	• Unsystematic material placement	4.5526	Strongly Agree	3
3	Poor Waste Management System	4.5485	Strongly Agree	6
	• High operation management cost	4.5460	Strongly Agree	2
	• Lack of inspection processes	4.5534	Strongly Agree	3
	• Lack of inspection technology	4.5461	Strongly Agree	1
4	Lack of Organisation Cleanliness	4.5632	Strongly Agree	3
	Encouragement	4.5789	Strongly Agree	1
	• Poor Attention	4.5724	Strongly Agree	2
	• No commitment	4.5329	Strongly Agree	4
	• Lack of programs	4.5592	Strongly Agree	3
	• Lack of campaigns	4.5724	Strongly Agree	2
	• Lack of inferior		Strongly Agree	
5	Deplorable in Living Conditions	4.5855	Strongly Agree	1
	• Unsafe temporary living quarters	4.5790	Strongly Agree	2
	• Unsatisfactory temporary living quarters	4.5658	Strongly Agree	3
	• Unhealthy temporary living quarters	4.6118	Strongly Agree	1
6	Risky with a Low Level of Security	4.5444	Strongly Agree	8
	• Lack of basic amenities	4.5592	Strongly Agree	1
	• Inadequacy of welfare facilities	4.5395	Strongly Agree	3
	• Poor working conditions	4.5461	Strongly Agree	2
	• Poor working environment	4.5329	Strongly Agree	4
7	Constant Infections of Disease	4.5526	Strongly Agree	5
	• Outbreak through sharing all facilities	4.5790	Strongly Agree	1
	• Unclean accommodation	4.5526	Strongly Agree	2
	• Unclean site	4.5263	Strongly Agree	3
8	Irresponsible Employer	4.5373	Strongly Agree	9
	• Difficult enforcement to eradicate illegal immigrants	4.5526	Strongly Agree	1
	• Low commitment level during inspections	4.5329	Strongly Agree	2

	• Prefer workers stay in the building under construction	4.5263	Strongly Agree	3
9	Inadequate Basic Facilities	4.5460	Strongly Agree	7
	• No provided toilets perfectly	4.5592	Strongly Agree	1
	• No provided electricity perfectly	4.5395	Strongly Agree	3
	• No provided water supply perfectly	4.5526	Strongly Agree	2
	• No provided portable water perfectly	4.5328	Strongly Agree	4

Based on Table 3, the highest ranking is 'Deplorable in Living Conditions' with the highest mean of 4.5855 and a 'strongly agree' consent level. 2nd in ranking is 'Inadequate Storage System' with a mean of 4.5636 and a 'strongly agree' consent level. Furthermore, ranking for 3rd is 'Lack of Organisation Cleanliness Encouragement' with a mean of 4.5632 and a consent level 'strongly agree'. 4th in ranking is 'Inefficient Material Usage' with a mean of 4.5592, and 5th in ranking is 'Constant Infections of Disease' with a mean of 4.5526. Moreover, for 6th in ranking is 'Poor Waste Management System' with a mean of 4.5485. 7th in ranking is 'Inadequate Basic Facilities' with a mean of 4.5460, and 8th in ranking is 'Risky with a Low Level of Security' with a mean of 4.5444. The lowest in ranking is 'Irresponsible Employer' with 4.5373. The consent level from 4th to 9th is 'strongly agree'. Only the highest three was chosen to calculate the final for cross-tabulation among the other ranking.

(c) Section C: Solution of Implementation That Occur for Industrial Hygiene on Construction Site (Objective 2)

This section is divided into ten different solutions as shown on Table 4.

Table 4: Mean Analysis for Solution of Implementation

No	Solutions	Mean	Consent Level	Ranking
1	Employer Responsibilities	4.4715	Agree	1
	• Provide cleanliness training	4.4605	Agree	0
	• Raise awareness about health	4.4737	Agree	3
	• Provide health supervision	4.4802	Agree	2
			Agree	1
2	Supervisor Responsibilities	4.4934	Agree	8
	• Provide enough facilities	4.4934	Agree	2
	• Maintaining the facilities	4.4868	Agree	3
	• Establish safety plans	4.5000	Strongly Agree	1
3	Worker Responsibilities	4.5021	Strongly Agree	6
	• Follow safety and health protocol	4.5066	Strongly Agree	1
	• Report directly if incident happen	4.5066	Strongly Agree	1
	• Keep re-hydrate	4.4930	Agree	2
4	Monitoring on Construction Site	4.5110	Strongly Agree	4
	• Record each time facility service	4.5197	Strongly Agree	1
	• Keep ventilated clean	4.5066	Strongly Agree	2
	• Sanitise facility on time	4.5065	Strongly Agree	3
5	Hand Wash	4.4978	Agree	7
	• Train handwashing techniques	4.5132	Agree	1
	• Use soap dispenser of soap bar	4.4934	Agree	2
	• Need more hand wash facility	4.4868	Agree	3
6	Drinking Water Portable	4.5066	Strongly Agree	5
	• Organise more drinking water portable	4.4868	Strongly Agree	3
	• Keep the piping system clean	4.5066	Strongly Agree	2
	• Need more clean water	4.5263	Strongly Agree	1
7	Facilities for Eating	4.5113	Strongly Agree	3
	• Need a secure place for eating	4.4934	Agree	3
	• Need clean ventilation when eating	4.5329	Strongly Agree	1
	• Need a secure dining furniture	4.5066	Strongly Agree	2

	set			
8	Removal of Equipment and Supplies	4.5115	Strongly Agree	2
	• Identify recycle materials	4.5329	Strongly Agree	1
	• Handle hazardous waste carefully	4.5197	Strongly Agree	2
	• Keep access routes clear from debris	4.4803	Agree	3
9	Practical and Cost-Effective Options	4.4913	Agree	9
	• Need more programs of hygiene by government	4.4869	Agree	2
	• The cost of equipment is high	4.5132	Agree	1
	• The cost for maintenance is high	4.4737	Agree	3
10	Improve Workers Performance	4.5132	Strongly Agree	1
	• Adopted employee welfare	4.5066	Strongly Agree	2
	• Provide complete temporary housing facilities	4.5395	Strongly Agree	1
	• Prioritize employee health	4.4934	Agree	3

Based on Table 4. The 1st ranking is ‘Improve Workers Performance’ with the highest mean of 4.5132 and a consent level of strongly agree. 2nd in ranking is ‘Removal of Equipment’ and Supplies with a mean of 4.5115 with a consent level of strongly agree. Moreover, 3rd in ranking is ‘Facilities for Eating’ with a mean of 4.5113 and a consent level of strongly agree. Moreover, 4th is ‘Monitoring on Construction Site’ with a mean of 4.5110 and a consent level of strongly agree. The consent level for ‘Drinking Water Portable’ and ‘Worker Responsibilities’ is also ‘strongly agree’ with a mean of 4.5066 and 4.5021 for 5th and 6th.

Furthermore, for 7th in the ranking, the consent level has changed to ‘agree’ with a mean of 4.4978 for ‘Hand Wash’. Next, 8th in ranking is ‘Supervisor Responsible’ with a mean of 4.4934 with a consent level of ’agree’. Last two solutions for 9th ‘Practical and Cost-Effective Options’ and 10th ‘Employer Responsibilities’ with a mean of 4.913 and 4.4715. Both consent level is ‘agree’. Among the ranking, all variables were chosen by the highest to the lowest rankings for evaluating cross-tabulations.

5.0 Conclusion

As a conclusion, it can conclude that all the respondents are having the same problems on the construction sites in Kuala Lumpur. The majority of the respondents are strongly agreed on the consent level with all the problems stated. As a result, it can be concluded that industrial hygiene issues in construction are happening on every construction site (John, Bruce & Gavin, 2021). The top five rankings for objective 1 are 'Deplorable in Living Conditions' is at the first ranking. The second in ranking is 'Inadequate Storage System. The third in ranking is 'Lack of Organisation Cleanliness Encouragement', the fourth in ranking is 'Inefficient Material Usage', the fifth in ranking is 'Constant Infections Disease'. In conclusion, the rankings for these problems show that the objective one is to identify the main problems on the construction site is accomplished. Meanwhile, improve worker’s performance, the removal of equipment and supplies and the facilities for eating are main solutions that occur for industrial hygiene on construction site. The solution might change the potential of the workers in the future. The finding relates to Zainol, Noraazman, & Jusoh (2020), industrial hygiene focuses on how hazards of the facility affect workers and on mitigating the potential impact upon the surrounding community and families of each worker.

Acknowledgement

The author would like to thank the Faculty of Technology Management and Business and Universiti Tun Hussein Onn Malaysia for its support.

References

Alias (2019). Health and Hygiene, Journal of Ardabil University. Retrieved on May 19, 2021.
Bates L R (2015). Construction site housekeeping: Why you want a clean workplace. Retrieved on May 7, 2021 from http://commonwealthtourism.com/construction
Bukhari A, Hassan S H and Ridzuan A R (2016). The Effectiveness of Industrialised Building System (IBS) with Respect to Waste Minimisation Compare to Conventional Method Final Year Thesis (UiTM Malaysia). Retreived on May 12, 2021.
Beglar, Ankur & Dinesh (2013). Likert Scale: Explored and Explained. Retrieved on May 6, 2021.
Borneo Post Online (2018). A roof over their heads. Retrieved on May 15, 2021.
Connelly, Lynne M. "Cronbach's Alpha." MedSurg Nursing, vol. 20, no. 1, Jan.-Feb. 2011, pp. 45+. Gale
Academiclink.gale.com/apps/doc/A250576953/AONE?u=anon~6f26571c&sid=googleScholar&xid=efcc7b 6f. Accessed 21 Dec. 2021.
CIMS (2021). Contractor G5 Grade in Federal Territiry Kuala Lumpur. Retrieved on May 7, 2021 from http://www.cims.cidb.my/smis/regcontractor/reglocalsearchcontractor.vbhtml
Desai *et al.*, (2014). Temporary housing: A state of the art survey. Habitat International, pp 136-141. Retrieved on April 8, 2021.
Eurostat (2012). An evaluation of Workers Welfare Facilities and its Effects on Productivity in Construction Industry. Thesis, University of Zambia, 2012. Retrieved on May 7, 2021.
Estelar & Baird (2020). 'An employee reward and recognition process', The TQM Magazine, vol. 9, pp. 328-35. Retrieved on May 15, 2021.
Hasan, S. H., Daud, N. M., Fauzi, M. A., & Halim, M. Z. B. A. (2018). Development of Cleanliness Framework for Malaysian Construction Industry. Retrieved on May 19, 2021.
Hatem Z. M. (2019). Management and Maintenance of the Welfare Facilities in Construction Sites. Master Thesis of Facilities Management (Universiti Teknologi Malaysia). Retrieved on May 5, 2021.
JICA (2018). Becoming Professional Industrial Hygiene: Opportunities and Future Growth, pp 35-38. Retrieved on April 8, 2021.
John, Bruce & Gavin (2021). Patty's Industrial Hygiene, pp 1-27. Retrieved on April 10, 2021. Kamal (2014). Construction-CIDB License. Retrieved on April 18, 2021.
Kam (2020). COVID-19 in Malaysia: CIDB to find temporary accommodation for construction workers.
Retrieved on April 15, 2021.
Kim, S & Cho, E. (2015). Cronbach's Coefficient Alpha: Well-Known but Poorly Understood. Organizational Research Methods, 18(2), 207.
Kevin (2012). The Industrial Hygiene Profession: Current and Future Issues. pp. 34. Retrieved on April 15, 2021.
Muaziah (2016). Assessment of Welfare Facilities in Construction Sites. Master Thesis of Facilities Management (Universiti Teknologi Malaysia). Retrieved on May 5, 2021.
Mydin (2016). Industrial Hygiene Guide. Journal of Hygiene. Retrieved on April 3, 2021.
Pharm (2008). Quantitative Analysis Descriptive Statistics. International Studied Publications. Retrieved on August 16, 2021.
Permana (2015). Construction Safety Practices. Master Thesis of Science Construction Management (University Teknologi Malaysia). Retrieved on May 12, 2021.
Pheng (2019). Kuala Lumpur: Competition and the Quest for World City Status. "Built Environment", 4(4): pp.270. Retrieved on April 20, 2021.
Phu N L and Cho A. M (2014). Factors Affecting Material Management in Building Construction Projects.
Retrieved on May 10, 2021.
Roth (2014). The Importance of Cleanliness in a Proper Construction Site Management in Malaysia: A Contractor's Perspective (Kansas City Business Journal). Retrieved on April 15, 2021.
Silvia (2014). Steps for Projects Implementation, Iskenderian University, Engineering College, Egypt, pp 1-2. Retrieved on May 5, 2021.
Teng and Razak N A (2017). Case Studies on The Safety Management at Construction Site, pp 90–108 The Star (2020). Workers' Welfare a Top Priority. Retrieved on April 15, 2021.
Watson (2014). Improving Working Conditions and Productivity in the Construction Industry, Geneva; International Labour Publications. Retrieved on May 7, 2021.

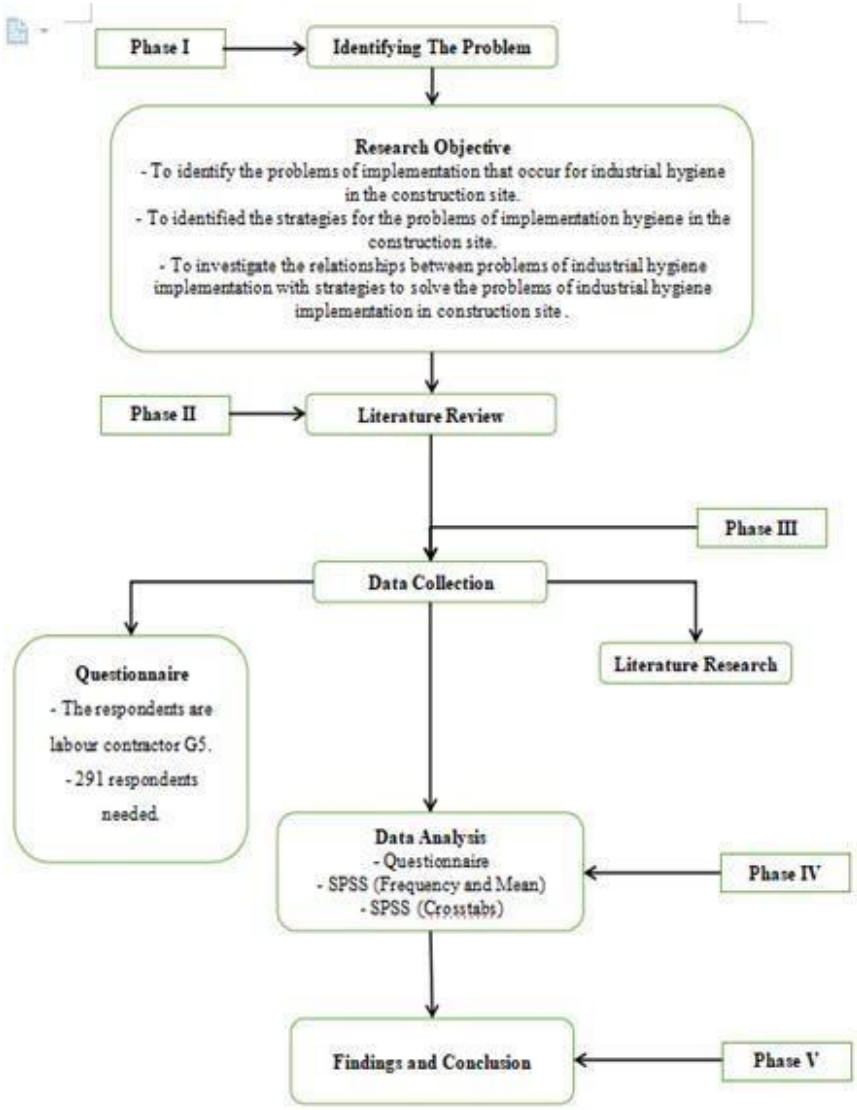
Wyatt D P (2013). Material Management, Part I. Occasional Paper (England: The Chartered Institute of Building, Berkshire). Retrieved on May 10, 2021.

Yee *et al.* (2017). Problems Faced by Contractors in Managing Foreign Workers on Construction Sites. International Proceedings Research, pp 131-135. Retrieved on May 15, 2021.

Zaini (2018). Safety Climate Among Contractors' Organization. Malaysian Journal of Civil Engineering 27 Special Issue 2 (2018): pp 230-240. Retrieved on April 25, 2021.

Zainol Z., Noraazman N., & Jusoh M.S. (2020). Investigation on the Effect of Industrial Hygiene towards Innovation Performance: A Case of the Construction Industry in Malaysia.: Earth Environ. Sci Retrieved on May 19, 2021 from https://iopscience.iop.org/article/10.1088/1755-1315/476/1/012013/pdf.

Appendix A



Research methodology