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A Study on the Adoption of Safety Culture in Construction Project in Klang Valley

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Abstract

The high rate of accidents and injuries in the construction industry globally enables us to evaluate our priority from the past performance to the major determinants of safety and health. By giving attention to human factors, organisations can identify and differentiate potential hazards of reckless behaviour prior to the incidents of accidents or illness. One way to achieve this is to measure 'leading' safety factors, such as safety culture. The objectives of this research are identifying the ways to adopt and implement the suitable and efficiency safety culture for the construction project in Klang Valley to prevent the accidents and injuries in construction industry as well as to provide a safe working environment. We use quantitative method with close-ended questionnaire and descriptive design for this study. The questionnaires inquired on the issues and problems and success factors in implementing safety culture in construction project. The company selected for this study was limited and only focus on 10 construction companies in Klang Valley. The total of the respondents was 40. The quantitative analysis of data was done using Average Index Method and the data were analysed using descriptive analysis. From the study, the most popular problems to adapt and implementing safety culture are the poor safety culture. The success factors in implementing safety culture were safety rules and procedures that are provided and easy to understand. Overall, the workers perception of the safety culture around Klang Valley construction site was fairly low with need for improvement such as safety practices from management, encourage of safety motivation and training on safety and health. The results and outcomes of the research can be used to guide construction management in establishing a positive safety culture and provide workers with the opportunity to have a platform to reflect on their motivations and choices for safety at work.

Keywords: Safety culture, safety rules and procedures, safety practices, safety motivation and training

1.0 INTRODUCTION

Definition of culture is a set of beliefs and societal values; safety culture is a unique combination of safety and culture; it can be divided into the moral culture, behavioural culture, institutional culture and culture of objects (Cooper, 2000). Moral culture is a collection of ideas and feelings about the basic responsibilities and boundaries of human beings. The moral concept is a guideline for acting on the right-wrong differentiation-to derive commitments, to explain arguments, to make decisions in cases where right and wrong are not obvious, and to determine the goodness or guilt of current behaviour (Kavolis, 1977). Behavioural culture refers to the company and its employees. Besides, culture teaches about the way people behave, interact with each other, connect and understand the world around them. Somebody's culture is represented by a group of people and acquired by socialization (Ahmed, 2019). While institutional culture described as a social form of social organization and tradition that is built within (Jappie, 2019). An organization to ensure its integration and ability to survive. They are characterized by a set of unidentified rules that shape values, beliefs, beliefs and patterns of thinking, behaviour patterns and communication styles (Jappie, 2019). Cultural objects can also be discovered almost everywhere. As outlined by Griswold (2013, p. 11), "a cultural object may be defined as shared significance embodied in form. In other words, it is a socially meaningful expression that is audible, visible, or tangible or that can be articulated". Cultural objects share stories, and they may be viewed in several different ways. The importance of cultural elements varies from person to person, as well as time and date.

Safety culture is an unseen and intangible power, and it is the creation and operation of companies slowly established in the long-term activities of production and management, which is the sum of the characteristics of the philosophy of safe growth, life and physical state, etc. Building a culture of security is a key strategy for promoting the safe development of the armed forces. To produce excellent safety measures, the individuals or organization must strengthen the construction of a culture of safety (Mei et al., 2019).

Within the safety culture, there are several researches in Malaysian construction industry related to safety behaviour and safety culture (Hamid et al., 2015). In the construction sector, every project leader understands the importance of conflict situations the health and safety of workers to maintain the safety of everyone who works on the construction site. They should also discover the perfect strategies for safety that are culturally relevant (Nelson, 1996). With safety practices, leaders should be able to manage the safety and cultural

requirements of the industry, to recognize them well so that their decisions on the project are right and very well prepared. Besides, these requirements will ensure that quality standards and safety performance are of the best standard. There has been no evidence for the construction industry in Malaysia of a consistent strategy to significantly improve the safety culture of organizations to enhance the safety efficiency of the industry; hence the need to implement this research and study to bridge the research gaps in safety performance in Malaysia.

2.0 PROBLEM STATEMENT

Construction is one of the most hazardous industries due to its dynamic, temporary, and decentralized nature (Li et al., 2015). The construction industry is inherently dangerous. Workers face risks constantly on job sites. In 2016, statistical figures from the Department of Occupational Safety and Health (DOSH) showed that 991 of 4,693 employees killed (21.1%) in the private sector were in construction. Such that, one out of five workers died in construction that year (DOSH, 2016). Furthermore, a recent report by the same department in 2020 portrayed the increasing trend with 66 workers in construction sector died (see Table 1). Hence, enhancing safety culture is a shared responsibility and everybody associated with the industry has a role to play (Thomas, n.d.). Most injuries at construction sites will not contribute well to the construction industry as far as safety culture is aware. In 2018, a fatal incident in which a Bangladeshi worker ended up dead on the location when the incomplete cement flooring beneath him broke down at the Tenaga Nasional Bhd. substation, next to the Cochrane Mass Rapid Transit Station in Kuala Lumpur, is also another example where safety supervision and good occupational safety and health (OSH) practices are found lacking (Lee, 2018). The recent accident in Sungai Besi-Ulu Kelang Elevated Expressway (SUKE) caused the death of three foreign workers and injury to a road user (Zack, 2021). This shows that even though Malaysia is trying its best to become a developed nation, the culture of safety is still not at par with developed countries.

Table 1 Occupational accident statistics by sector until December 2020
(Source: International Policy and Research Development Division (DOSH, 2020))

Sector	Non-Permanent Disability	Permanent Disability	Death	Total
Hotel and Restaurant	137	1	2	140
Utilities (Electricity, Gas, Water and Sanitary Service)	214	3	3	220
Finance, Insurance, Real Estate and Business Services	312	7	8	327
Construction	137	3	66	206
Transport, Storage and Communication	294	6	11	311
Manufacturing	4202	231	73	4506
Wholesale and Retail Trade	126	1	1	128
Public Services and Statutory Authorities	73	1	3	77
Mining and Quarrying	35	1	3	39
Agriculture, Forestry and Fishery	916	20	43	979
TOTAL	**6446**	**274**	**213**	**6933**

3.0 LITERATURE REVIEW

3.1 Safety Culture in Construction Industry

The safety culture goes much beyond the provision of the means for the necessary regulatory enforcement programme. In previous studies, the safety management program of the company has been checked to see how it is sustained during periods of the ongoing transition. Leadership changes, new hires, financial issues, mergers, and other circumstances can have a positive or negative effect on all facets of the company. Safety systems or practices will easily vanish unless the company has completely internalized the principles required to maintain inherent organizational hazards and related risks under appropriate control. The very first mention of "Safety Culture" is discovered in the report of the incident completed following the Chernobyl nuclear plant disaster of in 1986 (Roughton et al., 2019). Safety culture is also identified as the common values, cognition, engagement, beliefs, attitudes and communication and norms of the members of the organization that influence their safety behaviour and have a long-term effect on safety behaviour and safety efficiency (Chen et al., 2018). We find that awareness and actions of leadership influence the safety culture and safety efficiency of the construction industry (Skeepers & Mbohwa, 2015). Safety efficiency was influenced and strengthened with risk management and a strong protection organizational culture. A successful safety culture can be built by continuous and cantered cooperation between management and the staff, along with all other stakeholders, including suppliers, over the life cycle of the project. The establishment of a safety culture in the construction industry involves construction workers being prepared with accurate beliefs, attitudes, and values. Safety culture is a long-term primary focus for all stakeholders on workers and public safety at all organizational level. Low-quality safety culture can increase the levels of dangerous conduct and fatality (Chen et al., 2018). Gillen et al. (2014) evaluated the safety practices of South African construction and construction companies and noted the value of making managers perceive the development of safety culture as an investment rather than cost.

3.2 Issues and Problems in Adoption of Safety Culture in the Construction Industry

Certain information on management in the construction industry is required to ensure that the safety culture of the industry is strengthened. The rules shall regulate the safety management of factories, facilities and staff. To avoid incidents at work, a human attitude that is reactive and poor, usually normative, should be turned into a constructive and proactive culture (Bakri et al., 2006). Thomas (n.d.) conducted a study to address the safety problems and issues by analysing the existing safety culture in the construction industry. He opined that when a construction firm succeeds in creating a strong safety culture, it relays a pivotal value to any employee. A good safety culture enhances the integrity of an organization, which is one of the most important assets for any enterprise and plays a key role in its long-term success. The levels of safety culture at different stages of the project are compared to enhance the safety culture. This study implies that organisations with a strong safety culture often focus on safety practices in which they have systems in place to collect safety-related information, assess safety results, and bring people together to learn how to function more safely.

According to a previous research conducted by Nawi et al. (2016), they agreed that the lack of communication between manager and workers will be affected on culture in a construction site. Lack or poor communication during construction may lead to poor workmanship, injuries, disruptions, and misrepresenting. These, in effect, may trigger significant costs and time. Most of the time, the project manager is nowhere to be seen around in the site area and will normally stay at the construction site for only a few hours (Nawi et al., 2016). Lack of oversight by the supervisor in charge is one of the issues affecting the safety efficiency of the construction industry. At least once a week, there is no daily supervision. The supervisor is known as an intermediary facilitator to ensure safety procedure in the construction project. Good safety conduct of the supervisor can affect safety measures that avoid an unforeseen accident. Other than that, employees are not likely to report any injuries or accidents to the person in charge on the site (Nawi et al., 2016). Safety culture difficult to adopt because no supervision or good example from top management.

3.3 Success Factors Involved in the Development of Safety Culture in the Construction Industry

According to Yunus and Latiffi (2016), it is essential for a construction company to ensure its great performance, particularly in terms of health and safety, to stay ahead of the competitive construction industry. This is because the industry has a record-high number of accidents, injuries, and fatalities. The management team needs to start by paying enough attention to the approach to the management of health and safety that can be integrated between safety systems and people. However, an increase in safety can be accomplished if all project stakeholders change their values, behaviours, dedication, and behaviour to build a strong culture of safety. The goal of this study is to address the need for a positive safety culture to improve construction protection and health. Construction safety managers need to implement further approaches that focus not only on enhancing the physical working atmosphere and safety skills of workers but also on employee values and behaviours that can contribute to healthy conduct and a culture of safety (Misnan et al., 2008). The method the researcher used is to understand the safety culture among employee and employer. Therefore, both parties need to secure commitment and involvement to improve health and safety is recognized and encouraged.

■4.0 METHODOLOGY

The respondents of this study are members of project team involved in construction projects. The project team were selected for this study due to their roles in managing a construction site. Due to the pandemic of Covid-19, the company selected for this study was limited and only focus on 10 construction companies in the Klang Valley area. The number of respondents for this study were identified by using stratified sampling. Stratified sampling has the advantage in the matter of accuracy of results and the ease in performing the sampling. This research study was conducted in the quantitative method. By using this method, the sets of data that can be obtained by quantitative approaches are wide and can be easily interpreted from several perspectives. This method defines how the findings can eventually be applied to the development of collection initiatives (Goertzen, 2017). Researchers often strive to appeal to empiricism and aim to collect data, to analyze the relationship between data and whether these facts and relationships are compatible with hypotheses and findings of any research recently performed (Taylor et al., 2016). The approaches method for this quantitative research used a questionnaire. The questionnaire will be distributed to the 10 construction companies in Klang Valley. The questionnaire is intended to focus on a variety of factors that will be defined by the researcher as factors in the growth of the safety culture. Factors may involve leadership, training, communication, teamwork, safety and health committee and work environment. Table 2 delineates sample size by using stratified samples.

Table 2 Sample size by using stratified samples

Population	Group (Strata)	Obtain a simple random sample	Sample
All construction companies in Klang Valley	10 of construction projects in Klang Valley	4 respondents from each of the 10 on construction projects in Klang Valley	10 x 4 = 40 selected project respondents

The quantitative analysis of data was done using the Average Index Method. The data is calculated using average index as below which obtained by taking the sum of a set of scores and divide the total number of scores and the data will be analyses using descriptive analysis. The formula of average index is:

$$Average\ Index = \sum \frac{(\mu x n)}{N} \quad (1)$$

Where,
μ: the respondent's weightage given to each factor
n: the respondent's frequency
N: the total number of respondents

This study used the descriptive method which was the survey method to collect the primary data. the quantitative method with an online questionnaire was used for this study. 50 sets of questionnaires were distributed to several selected ongoing construction projects in Klang Valley. The data collected were then being analyzed by using the Average Index. The type of scale used to present the findings was nominal and interval scale, while the methods used to summarize the data were frequency and mean.

The results of the questionnaire were analyzed and presented using a table. The table is a way of showing information about how a total amount is divided up, consisting of a circle that is divided from its center into several parts. By using a table, a large data set were easily summarized in visual form, and it is a simple visual form compared to other types of graphs.

Thus, the objective of this research study would be to evaluate the element that needs to be discussed to adopt and implement the safety culture for the workers and contractors in construction to prevent any accidents and injuries.

5.0 RESULTS AND DISCUSSION

5.1 Issues and Problems

This part analyzes the issues and problems in adopting the safety culture in the construction industry. They can be classified into 3 main problems as poor knowledge about the safety culture at the workplace, safety culture value for employees in the organization and poor implementation of safety culture within an organization. These problems were selected with references from previous studies, and all collected data may get a reasonable description to support it. Refer to Table 3, analysis from average mean descriptive statistic is taken from the questionnaire that gains the average index of the mean of problem in adoption of safety culture in the construction industry. Thereby, the problem as arranging in rank based on the mean that indicates which problem is the impact more in the adoption of safety culture.

Table 3 Respondents toward the problem of poor knowledge about safety culture at workplace

Problem	Mean	Status
Poor safety culture intends to non-commitment to best practices to either cut cost or ensures fast production.	3.65	Agree
The lack of knowledge of responsibilities associated with the safety of the workers.	3.65	Agree

The poor knowledge about safety culture at workplace are recognize by poor safety culture intends to non-commitment to best practices to either cut cost or ensures fast production and the lack of knowledge of responsibilities associated with the safety of the workers which both problems were recorded 3.65 as highest issues to impede the adoption of safety culture in the construction industry.

Table 4 Safety culture value for employees in the organization

Problem	Mean	Status
The poor safety culture makes employees not caring to communicate with managers about health and safety	3.53	Agree

However, referring to Table 4, the problems of the poor safety culture make employees not caring to communicate with managers about health and safety recorded highest rate, 3.53 and most respondents agree with this problem in their organization.

Table 5 Poor implementation of safety culture within an organization

Problem	Mean	Status
There is a safety-reporting procedure, but poor implementation of safety culture makes us sometimes use them	3.23	Agree

Table 5 presents the problem of safety-reporting procedure, but poor implementation of safety culture makes us sometimes use them indicate as the major problem which recorded as highest average index, 3.23.

5.2 Success Factors

Table 6 analyzes the data of respondents toward the success factors involved in the development of safety culture in construction industry. The success factors of adoption of safety culture which is helpful toward the daily activities of workers regarding the management, safety rules, workplace, and environment. There have 6 main factors from the development of safety culture and some aspects were directly benefit from these stated advantages as employees, management, and environment. Factors had been listed out in questionnaire which used to give respondent answer it to achieving the objective of success factors involved in the development of safety culture in construction industry.

Table 6 Success factors involved in the development of safety culture

Factors	Aspect	Mean
Top Management Commitment	Management provides safety training	3.93
Safety Rules and Procedures	Safety rules and procedures are required	4.00
Communication	Workers get informed about accidents happened	3.98
Worker Competence	Workers understand fully risks related to my job	4.18
Work Environment	Worker's motivations increase because of the safety program	3.83
Worker Involvement	Workers are required to report accidents happened	3.93

Through the data collected from participants with safety culture, it is found that the most important success factors are adequate top management commitment is the management provides safety training as it recorded as highest index, 3.93. Training are important tools for informing workers and managers about workplace hazards and enhance safety culture in workplace so workers can work more safely and be more productive. Next factor is safety rules and procedure, its shows that most respondents agreed with safety rules and procedures are required and easy to understand since this both recorded the highest index, 4.00. Presence of safety rules and procedures may reduce accidents caused by dangerous conditions by providing a clear picture and borderline of the execution of the safety programme in the construction project. Besides, the success factor of communication recorded the highest index, 3.98 in factor of workers get informed about accidents happened. It is therefore necessary, in order to encourage the culture of site safety, to make available sufficient information lines from management to staff, and vice versa. Knowledge such as dangerous conditions and new rules and practises are also critical for fostering a culture of protection.

In addition, the next success factor is worker competence. The respondents put the highest ranked on factor of they understand fully risks related to their job as it is recorded the highest index, 4.18. Adequate skills, expertise, and ability of workers to work, particularly in relation to risks and hazards in their work, can mitigate accidents. This competence can be enhanced by learning and adequate selection of workers. Also, the aspect of the work environment is the circumstances and conditions at the position where the workers work, which directly lead the workers, as individuals or as a team, to the introduction of unhealthy actions. Most of respondents agreed with they do not feel that their job is boring, because this factor recorded the highest index, 3.83. This result may cover such internal conditions as motivation, boredom, and external conditions as time pressure, and blaming culture. It is important to have interest in their job so the safety behaviours can be implemented. Lastly, factor of worker involvement is very important in building workers awareness toward safety culture. The data collected shows most participants are required to report accidents happened as it recorded as highest index, 3.93. The type

of interaction can be the presence of employees during the implementation of the safety programme and the investigation and recording of injuries or hazardous activities. It is believed that a greater degree of participation would have a more positive effect on safety behaviours.

6.0 CONCLUSION

The conclusion was made based on the objectives of this study to answer the research questions. The identified issues and problems in adopting safety culture were classified into three main problems; poor knowledge about the safety culture at the workplace; safety culture value for employees in the organization; and poor implementation of safety culture within an organization. Based on the primary data collected for this study, the problems faced by the respondents while adopting safety culture in construction projects were ranked according to the mean values. The finding from this study shows that the issues that are more likely to occur while adopting safety culture in construction projects are poor safety culture intends to non-commitment to best practices to either cut cost or ensures fast production and the lack of knowledge of responsibilities associated with the safety of the workers. These two problems recorded as the highest index under the first main issues which are poor knowledge about the safety culture at workplace. Next, for the second problem is safety culture value for employees in the organisation. Based on the data collected, the problems of poor safety culture make employees not caring to communicate with managers about health and safety recorded as the highest index as it shows most participants might be faced this problem at their workplace. The third one, the main issues of poor implementation of safety culture within an organisation shows that the highest index was recorded on the issues of safety-reporting procedure was provided, but poor implementation of safety culture makes the participants sometimes use them.

Furthermore, most respondents highlighted the success factors to develop a safety culture in the workplace were leadership style, motivation, and commitment to best practice on safety culture. Best Practice referred to the side expertise, behaviour, determination, and trust for a free accident scene by highlighting important decisions that do not compromise the standard of protection (Geller, 2000). Leadership style will lead to a good management system. Thus, as a leader, it is important to play a leading role in transforming any work environment. It can be argued that top management is a pivotal driver of safety culture and this need to take account. Senior leadership must keep the workers informed of changes to safety rules under aspect of organisational safety practice. This in effect has a positive influence on the safety culture of the organisation. It also encompasses how management handles and communicates safety issues.

Besides, most respondents agreed that safety should never be compromised to improve production or quality works. This emphasizes the vital role of safety motivation in making construction personnel more motivated to follow safety procedures and make fewer errors in doing construction work. Personnel safety motivation mediates the relationships between safety culture in construction sites and personnel error behaviour. However, personnel safety motivation is not mediating the relationships between safety culture in construction sites and personnel attitudes toward violation behaviour. Construction personnel error and attitudes toward violations behaviors were collected depending on what construction personnel believe about their own behaviors. Therefore, it was an important target for this research to increase the sample size as the information in this study and all types of research are dependent on accurate and truthful opinions from the research participants.

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