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ASSESSMENT OF SAFETY MANAGEMENT ATTITUDE PRACTICES TOWARD THE SAFETY CULTURE OF THE CONSTRUCTION SECTOR

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Abstract

A safety management attitude is essential to create a safety culture at construction sites. The construction sector was known to have a high risk of site accidents. Then, preventing the risk of accidents requires the implementation of safety culture measures. A safety culture acts as a guide to decrease the risk. This study aims to assess the safety management attitudes toward safety culture at construction sites. A sample of 376 respondents was recruited to complete the questionnaires regarding management commitment, safety procedures, and compliance with safety culture. The SPSS 24.0 and AMOS 24.0 software were used to conduct the data analysis. The findings demonstrated that management commitment, safety procedure, and safety compliance significantly and positively affected safety culture (p-value< 0.05). Thus, adequate implementation of a safety culture was ensured to decrease the accidents at the construction site and achieve zero industrial accidents.

Keywords: Safety Management Attitude, Safety Culture, Construction Sector

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INTRODUCTION

The construction sector is known for its elevated risk of occupational accidents because it includes a transitional stage with the progress of the project (Him et al., 2020). The most significant cause of accidents in the global construction sector is rapid economic development and growth. Occupational accidents occur daily at construction sites. Juhari and Arifin (2020) agreed that the construction sector is the most dangerous industry due to high accident rates and fatalities at work. In the construction sector, accidents would negatively affect the company and extend the due date of a particular project. The high prevalence of workplace accidents at construction sites is related to issues with illness or injury, damage to property or equipment, near misses or decreased performance and productivity. Ahmed (2019) argued that workplace injuries had a significant budgetary impact on society, people, and businesses. It follows that the productivity and quality of construction enterprises have been affected by accident cases.

PROBLEM STATEMENT

The risk of accidents in the construction industry is more elevated compared to other sectors (Him et al., 2019). The typical accidents are slipping, sliding, contact with objects or equipment, and involving vehicles (Brolin et al., 2021). From the beginning to the end of the construction process, there is a danger of mistakes, which later become factors of industrial accidents (Bhagwat & Delhi, 2021). Accidents happened due to the usage of hazardous equipment, challenging working environments, complicated operating procedures, unsafe culture practices, and dangerous working conditions at construction sites. (Ahmed, 2019).

Unsatisfactory safety culture practices in the construction sector contributed to the high rate of accidents (Wu et al., 2016). This is the result of the contractor's attitude and their lack of awareness of the need to develop safety culture practices on construction sites (Naji et al., 2022). Most Malaysian contractors fail to create a culture of safety on the job site, especially among management and lower-level staff (Zaira & Hadikusumo, 2020).

As a result, the Occupational Safety and Health Department (DOSH) tracks the number of accidents in the construction sector each year. As shown in the accident statistics of Table 1 for Malaysia, which covers seven years from 2015 to 2021, accidents occur every year in the construction sector, whether they result in death, Non-Permanent Disability (NPD), or Permanent Disability (PD). (DOSH, 2021). Based on the increase in accidents and deaths involving workers on construction sites, it is evident that the number of industrial accident cases is growing alarmingly.

Table 1: Number of Accident Cases in the Construction Industry for Seven years

Types of accident (Case)	2015	2016	2017	2018	2019	2020	2021
Death	88	91	111	118	84	66	56
NPD	138	126	123	106	227	137	116
PD	11	5	6	8	15	3	7
Jumlah	**237**	**222**	**240**	**232**	**326**	**206**	**179**

Source: DOSH

The accident statistics (Table 1), clearly show that accidents in the construction sector need to be controlled to ensure that the industry develops in a relevant way and contributes to strengthening the national economy. This study was conducted to assess the relationship between safety management attitudes and safety culture. This study can contribute to the formation of theories and practices that help policymakers and construction contractors have a better understanding of the relationship between the variables of practice at construction sites (Onubi et al., 2020).

HYPOTHESIS

The formation of research hypotheses is formed as follows;
H^a1: There is a significant effect between management commitment and safety culture.
H^a2: There is a significant effect between safety procedures and safety culture.
H^a3: There is a significant effect between safety compliance and safety culture.

LITERATURE REVIEW

Safety Culture

The term safety culture describes an organization's environment and practices that have an impact on workplace safety risks (Cooper et al., 2019). Through internal elements including communication system efficiency, organizational readiness for change, and organizational accountability for occupational safety procedures, these practices assist in the formation of an effective safety culture. While Jaafar et al. (2018) stated that the effectiveness of external factors refers to the work environment, economic considerations, and attitudes that help to improve the establishment of a safety culture in the sector.

In a previous study, safety quality in the construction industry needs to be emphasized through safety culture practices. According to Amirah et al. (2019; Liao, 2015), safety culture is crucial to the effectiveness of safety management at work. This element can provide direction for the creation of policies and

procedures to enhance safety performance (Hinze et al., 2013). Accident risk can be decreased by effectively executing procedures and rules in the development of a safe work environment (Bhattacharya, 2015). This is following the safety culture practices that educate employees to behave responsibly and guide the behaviors to perform jobs safely (Goncalves & Waterson, 2018).

According to Amirah et al. (2013), the practice of a safety culture is the key factor in creating people who are constantly conscious of workplace safety. As a result, the construction industry needs to increase its commitment to a safety culture to reduce workplace accidents (Hinze et al., 2013). The promotion of a safe working environment indirectly increases awareness among those working in the construction industry, strengthens PPE programs and improves worker safety on construction sites (Li et al., 2015).

Management Commitment

The safety management attitude in the safety culture can be formed in the commitment of the management. According to Huang et al., (2012), the primary aspect of a safety culture is the contribution of managerial commitment. This is supported by Zohar's (2008) discussion of management commitment as the fundamental element in the theoretical or empirical development of the construct. High management commitment in the construction industry is based on the attitude and behavior of contractors who place a high priority on safety management practices (Rundmo & Hale, 2003). This statement is supported by previous studies that point out the importance of managerial commitment in creating a safe culture (Jaselskis et al., 1996). Ye et al. (2020) claim that top management's dedication to management systems, processes, and procedures promotes employees' comprehension of the value of maintaining safety on construction sites. In the meantime, Hong et al. (2018) have examined the efficacy of management commitment through safety management and planning. This is consistent with the management's successful implementation of safety management in the manufacturing sector.

Safety Procedures

Alruqi et al. (2018) assert that the contractor is in charge of putting safety procedures in place at the construction site. The use of procedures can aid in the widespread application of planning for a measure that reduces risks in construction projects (Sousa et al., 2015). Implementing safety procedures can increase safety performance, manage risk, and lower accidents on construction sites.

Safety procedures are the process of developing and implementing laws that act as instructions to be followed to increase safety at work. According to the Infrastructure Health and Safety Association (IHSA, 2021), a safety process is a set of instructions that takes workers step-by-step through a task and is intended

to lower risk by reducing potential hazards at work. This procedure was developed by recommendations and a risk assessment, as well as the best methods of prevention.

Safety Compliance

Safety compliance is another name for workplace safety conduct (Razak et al., 2013). According to Kvalheim and Dahl (2016), safety compliance is the requirement for individual behavior to maintain maximum safety at work. This refers to voluntary or natural conduct to improve safety issues that raise safety concerns and the willingness to suggest changes to workplace safety standards. Behavior is the primary factor in safety compliance, acting and thinking to uphold the quality of safety standards at the building site (Gressgard, 2014).

Observing safety compliance helps to lower the probability of workplace accidents. By following safe procedures while performing job duties, individuals can contribute to safety compliance approaches (Khoo et al., 2018). The danger of accidents in the entire construction process can be reduced with this compliance. This thus starts the construction process without the risk of occupational accidents (Cheng et al., 2022).

METHODOLOGY

A questionnaire served as the primary technique of data collection for this quantitative study. Based on a literature review, a set of questionnaires with 29 questions on them has been created. The questions are related to four areas of safety culture practices and their role in preventing occupational accidents in the construction sector. Aspects of management commitment (7 questions), safety procedures (6 questions), safety compliance (8 questions), and safety culture are among the four components (8 questions). Questions are formed based on a 10-point interval scale (1= Strongly disagree, 10 strongly agree).

Construction contractors from Malaysia's East Coast made up the study population. The East Coast region of Malaysia was chosen because of the construction industry's growth through the rapid development of infrastructure including basic facilities. Using stratified and systematic random sampling methods, 16185 construction contractors that are registered with CIDB and have construction licenses between G7 and G1 were chosen for the sample. Based on the number of the population, the sample size represented is as many as 376 people consisting of project managers in contractor companies. Project managers were given a total of 376 questionnaires. Two methods are used to distribute questionnaires to respondents: (1) direct distribution through meetings at construction sites and other locations, and (2) electronic distribution through Google Forms, including emails and text messages, as well as phone calls to remind respondents to complete the survey. Direct distribution yielded 215

responses in all, and electronic distribution brought in the remaining 161 responses. There were 376 responses from respondents in all.

Using IBM SPSS-AMOS Version 24 software, the data collected from the respondents were analyzed using the Structural Equation Modeling (SEM) technique. To respond to the study's hypothesis, analysis (SEM) was used. The estimated value of the regression (regression weight) between the constructs illustrates the AMOS program. In this study, the research hypothesis is put to the test to see if the independent construct has any impact or influence on the dependent construct. To determine whether certain elements of the analyzed data variations are consistent or inconsistent, SEM analysis is utilized.

RESULTS

SEM is used in this study's hypothesis testing to examine the interactions between constructs and determine whether the study model and study sample are compatible (Ismail & Amin, 2020). Based on SEM analysis, three hypotheses were evaluated to address the research questions and achieve the study's objectives. Combining indirect effects between the two variables is the aim of SEM analysis (Sahrir et al., 2022). Awang et al. (2018) explain that SEM produces two different types of output, namely graphic output and text output. Standardized regression values between constructs and typical regression values are produced via the graphical output. As seen in Figure 1, the SEM procedure generates standardized regression values as standardized regression weights.

The R^2 value for the safety culture construct is 0.48, according to the results of the SEM investigation summarised in Figure 1 (standard regression). This demonstrates that 48% of the safety culture among construction contractors is contributed by management commitment, safety procedures, and safety compliance. According to Akossou and Palm (2013), this model is accepted in the study based on the three constructs' greater than 40% contribution to the safety culture. While management commitment (32%), safety procedures (51%), and safety compliance (34%) all contributed to the safety culture.

The analysis of the study's findings was then approved under the three hypotheses (Ha1, Ha2, and Ha3). Ha1 demonstrates that management commitment and safety culture have a significant relationship (CR: 7.512, P: 0.00). Ha3 supports the hypothesis that there is a significant relationship between safety compliance and safety culture, while Ha2 establishes a significant relationship between safety procedures and safety culture (CR: 11.230, P: 0.00). (CR: 7.704, P: 0.00). All three hypotheses are accepted since the regression coefficient value, which $P<0.05$, is significant according to the analysis of the findings. Alternative hypotheses have now been accepted as a result of this. Table 2 presents a thorough analysis of the findings.

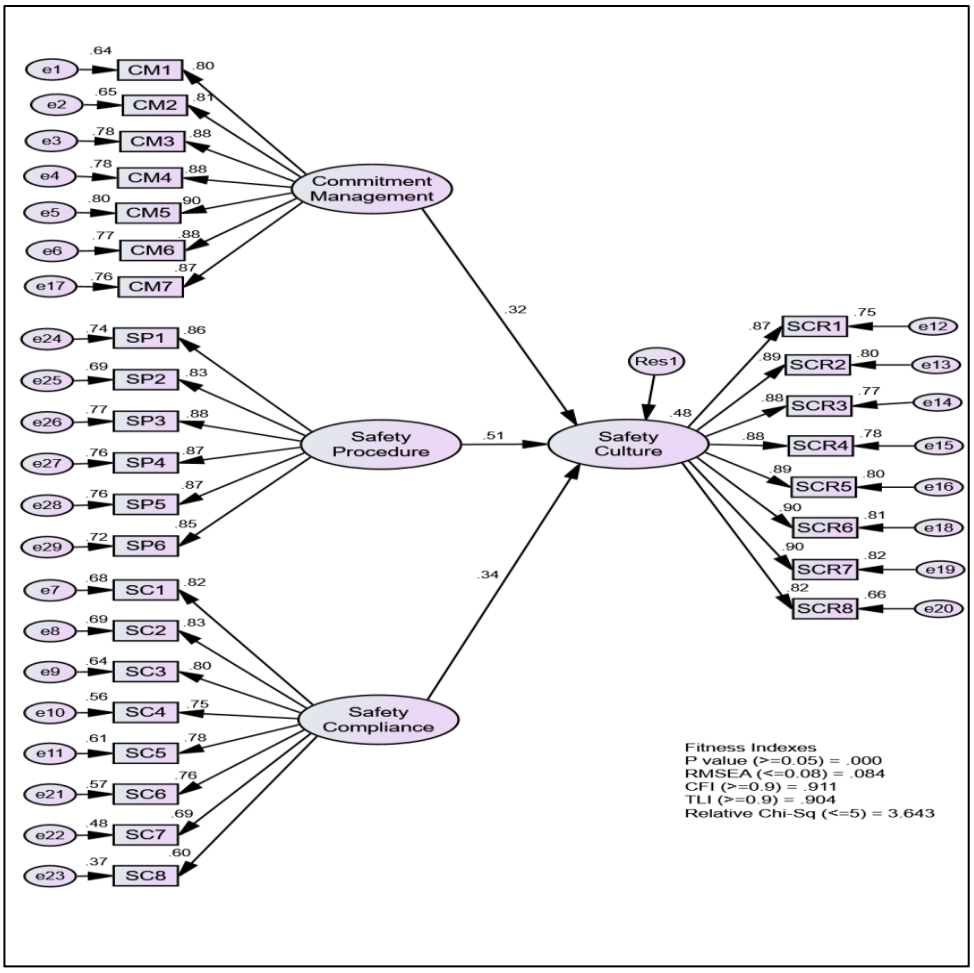

Figure 1: Structural Model SEM

Table 2: Regression Coefficient Value Between Constructs

		Construct	Estimate	S.E.	C.R.	P
Safety_Culture	<---	Commitment_Management	0.351	0.047	7.512	0.00
Safety_Culture	<---	Safety_Procedure	0.476	0.042	11.230	0.00
Safety_Culture	<---	Safety_Compliance	0.552	0.072	7.704	0.00

Note: P < 0.05
Estimate: *Beta - β*, same value with *regression weights*
S.E.: *Standard Error*
C.R.: *Critical Ratio*
P: *Probability Value*

DISCUSSION

The study's findings demonstrate that management commitment influences respondents' safety culture practices in the construction industry in a favorable way. This is so because management's strong commitment influences employees' commitment to exercising caution at work and helps establish a safe work culture on construction sites. Mpettianagement commitment is a key component in the development of safety culture attitudes. This is consistent with the findings of the study by Amirah et al. (2017), who discovered that management commitment stems from the perception of top management and industrial workers, who have infused knowledge to always apply safety culture practices well when doing work duties. This study demonstrates how management commitment aids construction contractors in developing and putting into practice safety culture measures at construction sites.

The analysis's results demonstrate that one of the activities that positively affect respondents' safety cultures is following safety procedures. Construction workers can control their conduct to reduce the likelihood of accidents at the site by following safety procedures. Muthuveeran et al. (2022) stated that risk assessment can guarantee a distinct risk context for project management procedures. This could assist in enhancing the management of safety procedures on construction sites. Workers are constantly aware of the possibility that exists in the construction sector thanks to safety procedures. Hu et al. (2016) claim that the backing of mining industry supervisors has had a beneficial direct impact on the application of safety procedures and the development of a safety culture. This demonstrates unequivocally how management's attitude toward continually reviewing and updating accident prevention measures at construction sites has been impacted by safety procedures (Alruqi et al., 2018).

The analysis of the findings from the hypothesis also demonstrated that safety compliance influenced the safety culture favorably. This is because safety compliance is an important component as a guide to compliance with safety regulations in the workplace. High compliance helps the construction industry to form a clean image and fewer occupational accident issues. Indirectly, safety culture practices can be effectively developed on construction sites. Abdullah et al. (2021) corroborate the study's findings by pointing out that safety compliance can be used to implement safety culture practices. This is because high compliance influences how easily rules and procedures are applied in the construction industry, improving safe work practices. These two techniques have reduced the danger of occupational accidents and improved the efficiency of the development of construction projects.

CONCLUSION

In Malaysia, the construction industry's implementation of a safety culture is far from ideal. The absence of a safety culture in the construction industry is attributed to several variables, including management commitment, adherence to safety procedures, and compliance. Various parties must therefore make efforts to enhance safety management at construction sites. The SEM analysis method was used in this study to improve the safety culture in the construction industry on Malaysia's East Coast. It places a strong emphasis on management commitment, safety procedures, and safety compliance. The establishment of a safety culture is influenced, according to standard regression results, by the management commitment factor model, safety procedures, and safety compliance. By continually enhancing the implementation of management commitments, safety procedures, and safety compliance, the study's findings which are the developed model can be used as a guide for all industry practitioners in the construction industry, including developers, contractors, subcontractors, law enforcers, occupational safety training centers, and others.

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