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The Effectiveness of Construction Industry Development Board (CIDB) Green Card Training Program for Foreign Workers Towards Safety Performance at Nadayu Site

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A B S T R A C T S

This paper focused on the impact of the Construction Industry Development Board (CIDB) Training Green Card Training program based on the general worker's knowledge, behavior, and safety performance at the Nadayu site and also discovered the primary factors affecting CIDB Green Card Training Program. For this purpose, 55 workers filled up the questionnaire before and after attending the safety training. The effectiveness of the workers can be determined through the knowledge acquired from the training and can be evaluated from their behavior through observation by management personnel at the site. On top of that, the performance of safety at the site can be evaluated through the numbers of NCR, Memos, Penalties, and first aid. The results show that language and the background of participants were found to be the strongest factor that is affecting CIDB Green Card Training Program. Basic safety knowledge of participants has also increased after attending the training and improvement based on workers' behavior at the site were observed as well. Improvements need to be considered to enhance the CIDB Green Card Training program by providing training in the native language, screening the workers who have experience in the construction line in Malaysia, implementing various methods of teaching, presenting updated slide presentations, and evaluating participants to test their understanding.

A R T I C L E   I N F O

1. INTRODUCTION

The construction industry plays a big role to contribute to the country's development and indirectly contributes to improving the quality of life for locals (Stephen & Festus, 2022). This construction industry can consume and connect with local raw materials (Patil *et al.*, 2022; Irawan *et al.*, 2021). This construction can be also encouraged in the educational field (Babalola & Omolafe, 2022a; Babalola & Omolafe, 2022b).

The industry provides job opportunities for approximately 800,000 people in this country. It requires high numbers of manpower from locals and foreigners together to keep the industry moving as required by the Malaysian government. Undoubtedly, the construction site is one of the most dangerous workplaces in Malaysia. The construction workers deal with hazardous sources, situations, and activities most of the time. Perilous activities such as scaffolding, excavation, working with machines, and electrical-related equipment have become common for construction workers. Based on the SOCSO report, within these five years, the number of major accidents that occurred in Malaysia has slightly increased. Most of the report concludes that the root cause of the accidents was due to human error for example slips, trips and falls from height, being struck by an object, electrocution, and being caught in machinery. To increase awareness of safety and health among the workers of the industry, laws, and regulations have been set up not only to minimize these accidents but also to reduce the severity. One of the laws and regulations provided by the national agency is the safety training program. It is considered a preventive program that functions to protect the construction workers. Safety Training is a paramount preventive program where it provides awareness of safety to the local and foreign workers. At the same time, its objective aims to reduce the number of accidents in the workplace. From the safety training program, the workers will be able to understand the impact of conducting safety habits and safety acts at the construction site.

Aristotle once said that "We are what we repeatedly do. Excellence, then, is not an act but a habit ". By taking the quote that we must develop a safety habit if we want to be safe. Unsafe acts and unsafe habits among workers can be reduced directly by safety training which can control the accident rate. Cost of compensation, workplace stress, regulatory fines as well as productivity lost indirectly can reduce

This study aims to gather feedback among foreign workers and site management staff (engineer, project manager, and site safety supervisor) about the Construction Industry Development Board (CIDB) Green Card program. The study also reveals the impact of the Green Card Training program before the training session and the results after the training. The knowledge gained from the training can be implemented in their daily work. Thus, improving the safety at the construction site.

The research objectives in detail are as follows:
(i) To identify the factor that leads to the effectiveness CIDB Green Card Training Program
(ii) To evaluate the effectiveness of the CIDB Green Card Training Program based on workers' knowledge.
(iii) To evaluate the effectiveness of the CIDB Green Card Training Program based on behavior at the site.
(iv) To evaluate the effectiveness of the CIDB Green Card Training Program based on safety performance at a construction site after training.

To achieve the above research objectives, the following research questions (RQ) are used:
(i) RQ1: What factors lead to the effectiveness of CIDB Green Card Training?

(ii) RQ2: Does the CIDB Green Card Training Program influence based on the worker's knowledge?

(iii) RQ 3: Does the CIDB Green Card Training Program influence based on the behavior of workers at the site?

(iv) RQ 4: Do the CIDB Green Card Training Program influence based on safety performance at a construction site after training?

2. METHODS

This section includes the necessary research methods that are required in collecting and analyzing the data obtained. Besides that, this chapter also reviewed the population and sample population, the instrument of the study, and data analysis. Emphasis has been given to the critical stage in this research which are data collection, data analysis, and data evaluation. Choosing and using the appropriate research methodology is very important so as not to miscalculate and misanalyse the study.

The study has been conducted by distributing questionnaires, observing, tracking the previous record, and conducting an interview. The purpose of this study is to study the effectiveness of the CIDB Green Card Safety Training Program for improving safety at construction sites. The results gathered from pre and post-training programs were compared with the statistic of accidents reported. This helps to determine if there is a reduction in terms percentage of accidents. The reduced number of NCR, Penalty System, and also understanding of the workers about safety.

The questionnaires were distributed to the participants (general workers) who are entirely involved in the construction project. The comprehensive input from the site management such as the engineer, project manager, supervisor, and site supervisor support the results gathered through the qualitative method (interview). The data from the questionnaires will be analyzed using Statistical Package for Social Science (SPSS) version 21.0 and Microsoft Excel.

We also used a literature review for obtaining the data. The data were then summarized to get an explanation. Several references were used, including Anger *et al*. (2009), Endroyoa, *et al*. (2012), Gervais (2003), Jafari *et al*. (2014), Juarez-Carrillo *et al*. (2017), Pinto *et al*. (2011), Tam and Fung (2012), Tovar-Aguilar *et al*. (2014). We also used some literature on websites, such as http://www.dosh.gov.my/index.php/en/occupational-accident-static, Retrieved on 1 January 2018.

3. RESULTS AND DISCUSSION

This chapter discusses the findings of the research conducted at the Nadayu construction site. The sample of the study consists of 55 workers who are working at the Nadayu site. All the 55 workers who have participated have filled up the questionnaire prepared by the researcher. The site management personnel and general workers involved provide the best possible cooperation for the success of this study.

The analysis of the study is based on the information obtained through the questionnaire that has been distributed. All data were analyzed descriptively by using the frequency distribution method, percentage, and also mean value. We used the IBM Statistic Package for Social Science (SPSS) software version 21.0 to analyze the data obtained from the gathered questionnaire. This software is selected because the process of analyzing can be done easily

and quickly and provides the right decision to discuss in this chapter. The output from the interview and documentation study is also discussed in this chapter

3.1. Section A - Demographic Survey

Based on **Figure 1**, most of the workers are from Indonesia with a total of 37% followed by Bangladeshi 31%, and 16% of Pakistani and Myanmar foreign workers. Therefore, it can be said that the race that contributes mostly to this study are Indonesian and Bangladeshi workers.
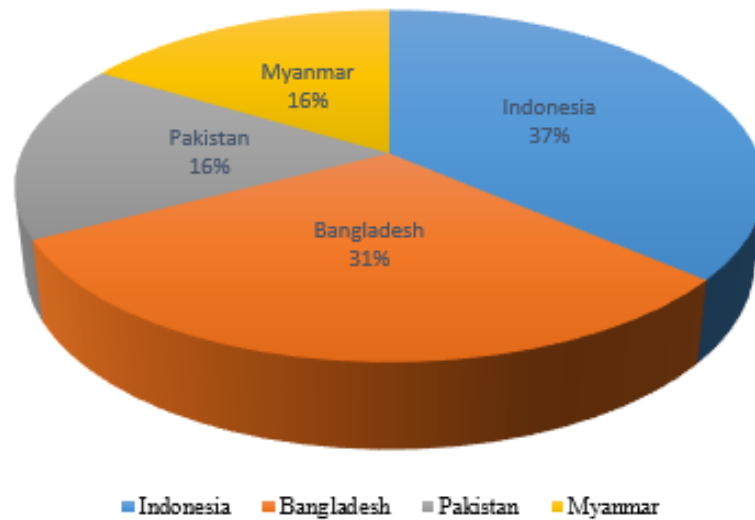

Figure 1. Percentage of foreign general workers in nadayu's site

Based on **Figure 2**, the highest level of the educational background of the foreign general workers is secondary at a total of 41 workers and the balance of 14 workers only have primary as their highest level of educational background.
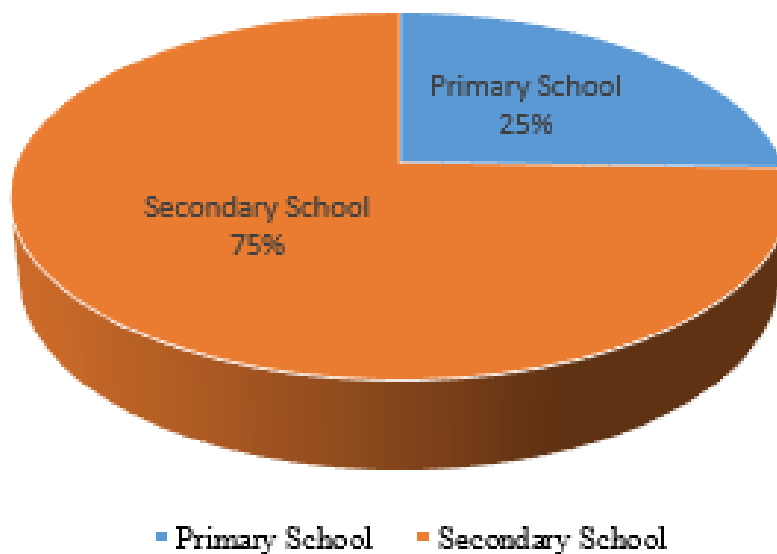

Figure 2. Percentage of the background of foreign general workers.

Based on **Figure 3**, it is clearly shown that most of the respondents with a total of 23 workers who are from the age group of 31 to 35 years old have 6 to 10 years of working experience. However, the respondents from the age group of 21 to 25 years old which consist of 2 workers have 1 to 5 years of working experience.
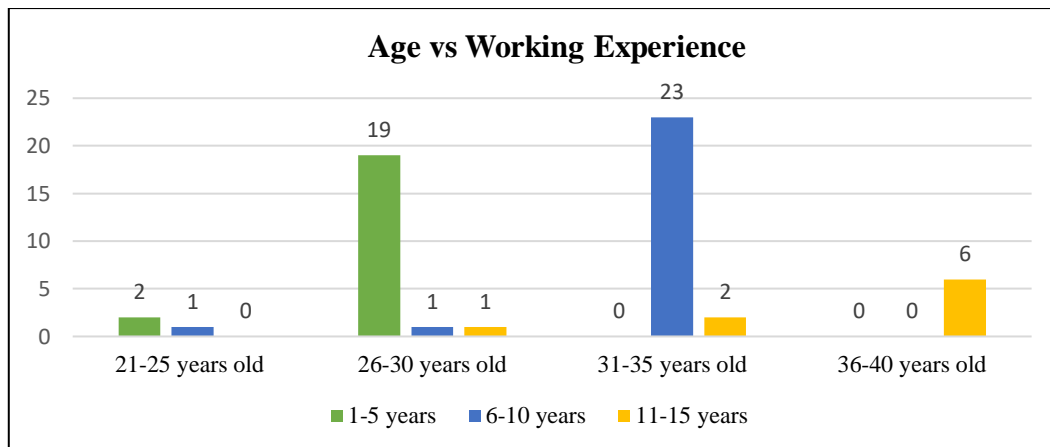

Figure 3. Age vs working experience of foreign general workers at nadayu site.

Based on **Figure 4**, before entering Malaysia most of the foreign general workers were involved mainly in the construction field which is 71% followed by agricultural 27%, and manufacturing 2%. Therefore, it can be said that most foreign general workers have experience in the construction field even before entering Malaysia.

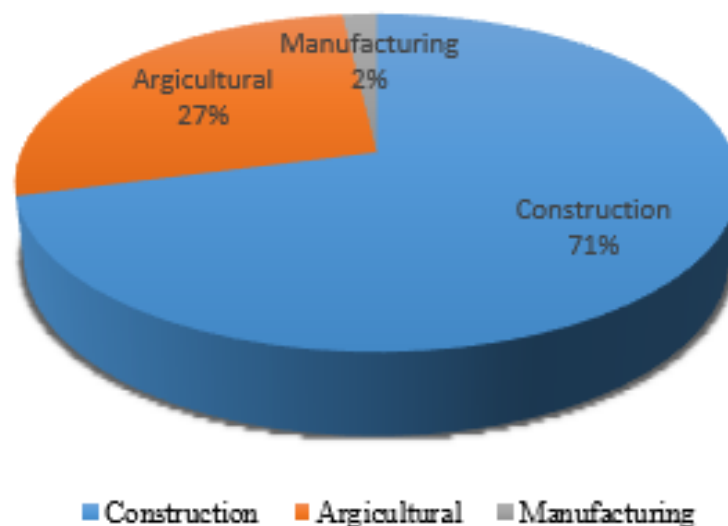**Figure 4**. Percentage of past working field of foreign general workers before entering Malaysia.

Based on **Table 1**, most of the participants are from Indonesia with a total of 20 workers which consist of 17 Bangladeshi workers, 9 Pakistani workers, and 9 Myanmar workers. All the participants chosen for this study are male. Majority of the participants aquire "Bahasa Melayu" as their first language.

Table 1. Respondent's nationality and gender.

Characteristic	Category	Frequency	Percentage (%)
Nationality	Indonesia	20	36.36
	Bangladesh	17	30.91
	Pakistan	9	16.36
	Myanmar	9	16.36
Gender	Male	55	????

3.2. Section A - Demographic Survey

Based on **Table 2**, the value of R2 is 0.888, thus it can be said that three factors that lead to the effectiveness of the CIDB training program are language, background, and safety knowledge which attain 88.8%.

Table 2. Result of the factors which contribute to the effectiveness of the CIDB Training Program.

Model	R	R Square	Adjusted R Square	Std. error of the Estimate
1	0.946[a]	0.895	0.888	0.819

a. Predictors: (Constant), Safety_Knowledge, Background_Participant, Language

According to **Table 3**, F statistic = 144.21 shows a positive and significant correlation between 3 factors with the effectiveness of CIDB Green Card training.

Table 3. ANOVA test on knowledge, background, and language of foreign general workers.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	290.306	3	96.769	144.214	0.000[b]
	Residual	34.221	51	0.671		
	Total	324.527	54			

a. dependent variable: cidbtra
b. Predictors: (constant), safety_knowledge, background_participant, language

As shown in **Table 4**, the language and background of the participants were found to be the strongest factors affecting CIDB Training effectiveness based on Beta Language = 0.67 and Beta Background = 0.348 which are quite significant.

Table 4. Results on the factor affecting CIDB Green Card Training Program

Model		Unstandardized Coefficients			t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.593	0.737		7.589	0.000
	Language	2.107	0.287	0.657	7.332	0.000
	Background_pasticipant	1.059	0.212	0.348	4.987	0.000
	Safety_Knowledge	0.014	0.325	0.004	0.043	0.999

a. dependent variable: cidbtra

3.3. Questionnaire Analysis for Research Question 2: Does the CIDB Green Card Training Program influence based on the workers' knowledge?

Table 5 shows that the basic knowledge of safety based on the pre-test is 3.1758. The knowledge of participants also increases by 4.6606 after attending the training. Thus, it can be concluded that CIDB Green Card Training is effective for general workers at Nadayu Site.

Table 5. Comparison table between posttest and pre-test.

		Mean	**N**	**Std. Deviation**	**Std. Error Mean**
Pair 1	Post_test	4.6606	55	0.22558	0.03042
	Pre_test	3.1758	55	0.83913	0.11315

Table 6 shows that the value of t- is 14.602 which denotes that there is an increase in participants' knowledge after attending the training.

Table 6. T-test analysis for post-test and pre-test after CIDB green card training program.

	Paired Differences					**t**	**df**	**Sig. (2-tailed)**
	Mean	**Std. Deviation**	**Std. Error Mean**	**95% Confidence Interval of the Difference**				
				Lower	**Upper**			
Pair 1 Post_Test-Pre_Test	1.484	0.754	0.101	1.280	1.688	14.602	54	0.000

3.4. Questionnaire Analysis for Research Question 3: Does the CIDB Green Card Training Program influence based on workers' behavior at the site?

For question number 1 with the statement "The worker adequately performs the job" 4 respondents answered Often (57.1%) and 3 and 4 respondents answered (42.9%) always. The mean value is 4.43 at a high level. F statistic = 144.21 shows a positive and significant correlation between 3 factors with the CIDB training effectiveness.

For question number 2 with the statement, "The worker easy to follows the instruction given" 3 respondents answered often (42.9%) and 4 respondents answered always (57.1%). The mean value is 4.00 at a high level.

For question number 3 with the statement, "The worker wears PPE all the time" 7 respondents answered always (110%). The mean value is 5.00 at a high level.

For question number 4 with the statement, "The worker more concern about safety awareness at site" 3 respondents answered often (42.9%) and 4 respondents answered always (57.1%). The mean value is 4.00 at a high level.

For question number 5 with the statement, "The worker does repetitive mistakes" 2 respondents answered always (28.6%) and 5 respondents answered seldom (71.4%). The mean value is 4.14 is a high level.

For question number 6 with the statement, the worker does housekeeping after office hours .7 respondents answered always 110%. The mean value is 5.00 at a high level.

For question number 7 with the statement, "The worker uses safety access ways" 1 respondent answered seldom (14.3%), 5 respondents answered sometimes (71.4%) and 1 respondent answered always (914.3%). The mean level is 3.14 at a moderate level.

For question number 8 with the statement "The worker uses taglines when hosting" 3 respondents answered seldom (42.9%),1 respondent answered sometimes (14.3%), 2 respondents answered often (28.6%) and 1 respondent answered always (14.3%). The mean value is 3.14 at a moderate level.

For question number 9 with the statement, "The worker has knowledge of how to respond to any safety and health concern at the workplace" 1 respondent answered sometimes (14.3%), 1 respondent answered often (14.3%), and 5 respondents answered always 71.4%. The mean level is 4.57 at a high level.

For question number 10 with the statement, "The worker knows what are necessary precautions that they should take while carrying job at site" 2 respondents answered often (28.6%) and 5 respondents answered always (71.4%). The mean level is 4.71 at a high level (see **Table 7**).

Table 7. Analysis of training effectiveness based on workers' behavior at the site.

Item	Never		Seldom		Sometimes		Often		Always		Mean	Mean Level
	f	%	f	%	f	%	f	%	f	%		
Q1	0	0.0	0	0.0	0	0.0	4	57.1	3	42.9	4.43	High
Q2	0	0.0	0	0.0	0	0.0	3	42.9	4	57.1	4.00	High
Q3	0	0.0	0	0.0	0	0.0	0	0.0	7	100.0	5.00	High
Q4	0	0.0	0	0.0	0	0.0	3	42.9	4	57.1	4.00	High
Q5	0	0.0	5	71.4	0	0.0	0	0.0	2	28.6	4.14	High
Q6	0	0.0	0	0.0	0	0.0	0	0.0	7	100.0	5.00	High
Q7	0	0.0	1	14.3	5	71.4	0	0.0	1	14.3	3.14	Moderate
Q8	0	0.0	3	42.9	1	14.3	2	28.6	1	14.3	3.14	Moderate
Q9	0	0.0	0	0.0	1	14.3	1	14.3	5	71.4	4.57	High
Q10	0	0.0	0	0.0	0	0.0	2	28.6	5	71.4	4.71	High

3.5. Questionnaire Analysis for Research Question 3: Does the CIDB Green Card Training Program influence based on safety performance at a construction site after training?

The table 7 shows that in July, the mean value of the safety performance=5.200 (high NCR, Penalty, Memos, first aid). However, in November the mean value of the safety performance=1.800 which has reduced greatly and is also an improvement (reduce of NCR, Penalty, Memos, first aid).

Table 7. Result on T value from July until November 2018.

	Mean	Std. deviation	Std. error mean	95% condidence interval the difference		t	df	Sig. (2-tailed)
				Lower	Upper			
Pair 1 July-Nov	3.400	1.516	0.678	1.516	5.283	5.013	4	0.007

Based on **Figure 5** of Safety Performance at Nadayu Site throughout the five months, there is a decrease in the numbers of NCR, Memos, First Aid, and Penalty in November 2018. Numbers of non-compliance are constant in July, August, September, and October 2018 but in November 2018 the number had reduced to 50.0% becoming only 1 number gets from the Client.

The number of memos received from a client who issued a complaint has also reduced in July at Nadayu Site. received 8 memos, and the memos increased (%) from August 2018 become 9 number, In September, they reduce to 8 number, but in October and November 2018, the number reduces from 4 number to 3 number of memos (%).

First Aid is divided into 2 categories which are minor accidents and major accidents. Minor accidents were reported to be 6 cases at site constantly for 2 months (July and August) but the number reduces to 5 cases in September 2018. From October 2018 to September 2018 the number of First Aid was reduced from 3 to 2 (%). Minor accidents constantly number is 3 number but the number reduced to 2 and 1 on September and October. In November there were no minor accidents reported.

The number of penalties showed a reduction in July is 7 to 6 in August and September 2018. In October and November 2018, the number decreased to 4 and 3 number. Total increase from the previous 4 months was 42.85%.
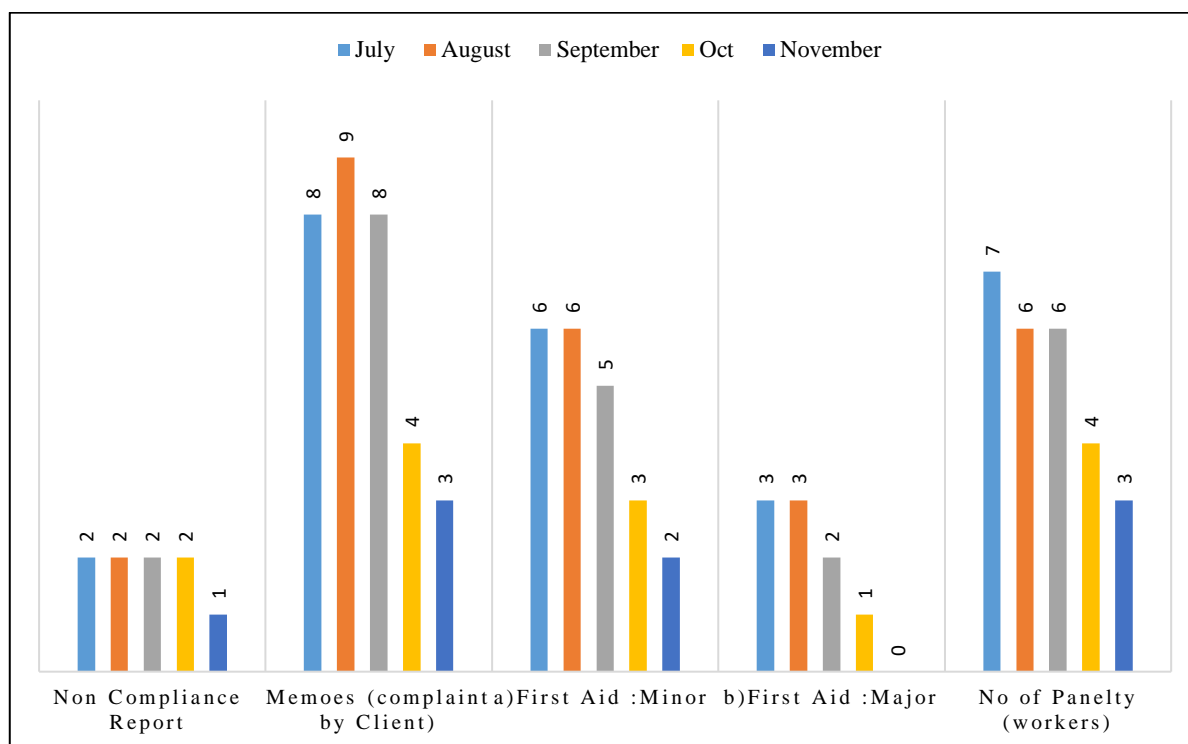

Figure 5. Safety performance at nadayu site.

3.6. Interview Analysis for Research Section C: Question 1 Do you think CIDB Green Card Training helps the company's safety performance?

Informant 1- Yes, it is easy for employees to understand safety in the workplace, moreover, it is easy for a safety officer to give a briefing during toolbox meetings because they already have some knowledge about safety at work. Understanding knowledge, the worker will alert about do and don't at site.

Informant 2 - Yes from my observation, the number of penalties reduces, and also the number of memos rises by the client, the understanding about hazards at the workplace increase is reflected by their action and behavior while working.

Informant 3 - Yes, I can see most of them become more alert and careful while working at the workplace. What can I see they already know their responsibilities without being told by the supervisor, for example, housekeeping after working hours?

Informant 4 - From my observation, CIDB Green Card training is a good approach for the Malaysian government to promote safety and health in the workplace and it is better if the workers can practice this at the workplace.

Informant 5 - From my point of view, this training is one of the company's commitments to raise safety awareness among workers by giving positive input to them to impose a good safety culture at the site.

Informant 6 - The safety performance of the company does not show improvement too much within the short term but we can see the individual performance for example from their responsibilities in doing their work, responsibility to others, and themselves.

Informant 7 - From my view, the mindset of the workers changes after attending the class, we can observe through their routine work especially their actions and habit for example cleanliness and housekeeping issues in their work area. It reflects on the decreasing number of memos sent by the client in a complaint form.

4. CONCLUSION

In this study, we discussed the results of the study from chapter four and then make a summary of the overall study results. The discussion is on the workers' demographic study, background, basic safety knowledge, and factors that affect the effectiveness of training (eg; language barrier). Then followed by a discussion on findings which are evaluating effectiveness based on workers' knowledge, behavior at the site, and safety performance at a construction site after training. The researcher has presented some suggestions in the conclusion so that it can be addressed to the parties involved such as the Malaysian government, CIDB, and trainers to develop the effectiveness of training. In addition, this study can be used in my future study as well by doing some in-depth and comprehensive exploration. Last but not least, the implication and suggestions for future studies are also discussed in this part.

This study aims to identify factors affecting the effectiveness that make CIDB Green Card Training Program. On top of that, this study also aims to evaluate the effectiveness based on workers' knowledge, behavior at the site, and safety performance at a construction site after training. In summary, the results of this study can be summarized based on the objectives of the study and are as follows:

(i) The findings of the study showed that the language and background of participants were found to be the strongest factor affecting CIDB Green Card Training Program.

(ii) Findings showed that the basic safety knowledge of participants increases after a training session.

(iii) Findings showed an improvement based on workers' behavior at the site.

(iv) Findings showed an enhancement in the safety performance of the Nadayu's site by a decrease in the number of NCR, memos, first aid records, and the number of penalties.

6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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