Influence of Worker’s Attitude and Communication Skill towards Safety Performance in Construction Site

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Abstract. The construction site is one of the most hazardous working places with numerous sources of hazards and potentially high risk to deals with. Typically, the main sources of hazards are unsafe condition and unsafe act by the human. Eventually, both sources related to human errors which potentially have an effect on the performance of the site. To reveals the underlying, this study aims to determine the influential factors that governed the success of safety performance of a construction site. The study involved a self-administered three-part questionnaire among the construction personnel. Part A measures the workers’ attitude and safety performance while Part B on communication skills. The respondents randomly selected from construction sites range from school building and infrastructure renovation. The sample size was 113. From the survey, it was found that the most influential factor was the worker's attitude and followed closely by communication skills. Suggestion and recommendations on equipment design and improved work practices and procedures to improve efficiency and productivity of construction workers were proposed. Management was urged to get their workers better informed about safety matters.

1. Introduction

Construction is a complex activity because in the construction industry, there are high demands of the job where various contractors are present working under constant challenge. Several risk factors such as organizational structure, communication, clear instructions, safety culture, codes and standards, training, leadership and responsibility are needed for each job in the construction industry [1]. Thus, requiring the establishment of quality and safety management system in the said workplace to prevent any unsafe working area.

The construction industry has been labelled as the most hazardous workplace due to a high number of fatality rates on construction sites as well as being dubbed as “dirty”, “dangerous” and “difficult” [2]. Construction workers are one of the most vulnerable members in a project. During their work at the sites, they are facing a wide variety of hazards while performing their task. Department of Safety and Health (DOSH) have concluded their current investigation, which showed that construction sites have the highest death toll among all the industries [3]. From a monetary aspect, employee safety is costly in many terms. If an accident has occurred at the construction sites, not only causes horrible human disasters but create substantial economic losses and damages on plant, equipment and workers. Consequently, the production work time at the construction sites will be stopped until the normal site working environment and morale return to the initial state. Thus, the construction industry required the
implementation of effective safety measures and safety management system in the effort to achieve better safety performance.

The objective of this study is to determine the most influential human’s factor contributing to the success of safety performance as perceived by the workers. The result might assist the management in optimizing the utilization of available resources to improve the overall performance. The key strategy to eliminate construction-related accidents is the implementation of safety measures and safety management in the construction industry [4]. The outstanding safety performance is closely related to construction projects where an influential factor is established, implemented and maintained [5]. The management may benefit from success factors to eliminate unsafe practices by workers and provide a safe working environment which substantially reduces accidents. Moreover, effective safety management could guarantee that the worker’s lives would be protected, plus worker’s morale and motivation would be improved, which leads to high-quality products and services. In the financial aspect, the cost would be reduced, and returns on investments would be maximized [5].

2. Factors Affecting Safety Performance

Over the years, Construction Industry Institute of United States has been proposing the most effective safety techniques for projects such as pre-project planning for safety, written safety incentives, and safety orientation and training [6]. In general, there are strongly linked between historical, economic, psychological, technical, procedural, organizational and work environment issues with safety on construction sites [6]. To cultivating a positive occupational safety and health (OSH) culture at the construction site requires tireless effort and continuous organization’s commitment toward safety. Fundamentally, the organizational safety policy is the most influential factor driving safety performance in the construction industry. Still, without a proper plan and implementation strategies, the safety culture is hard to be achieved. Thus, other attributes like improvements in organizational structure, safety responsibility and accountability, communication, employee and employer’s behaviour, employee involvement, and employee responses might have a significant effect in improving the safety performance.

Besides, to avoid reoccurrence of accidents in the same site, the post-accident investigation should be performed to determine the root causes. The root causes are commonly highlighted, comprising of two major contributors, i.e. unsafe acts and unsafe conditions. These contributors were related to human errors. Supervisors play an important role in delivering the safety culture at the site. A high spirited with outstanding safety attitude supervisors will develop a positive safety culture in the site. Nevertheless, another proactive way in improving personnel safety performance is constant monitoring of human errors in construction sites, especially regarding the safety rules and regulations as well as faulty judgment [7]. Subsequently, considering human touch could help to prevent any unsafe behaviours and personnel errors [2]. Since attitude is part of behaviour [8], assessing employee’s attitude toward performance can potentially reveal the answers in developing the safety culture, thus, coping any possibilities of accidents on the site [2].

In safety, human intervention is very crucial, especially in a very hazardous area like construction sites. A breakdown in human’s communication will lead to a disastrous event; thus, a well-planned safety meeting or safety briefing is an excellent morale builder. The employees will be convinced if his employer is concerned about his safety and welfare. As a result, the employee will conform to the safety rules and perform his work in a safe manner [9]. Furthermore, smaller meetings for specific crafts also may be appropriate, with more discussion dealing with immediate problems. For field workers, which have a variety of work assignments, a study of the safety aspects of each new job assignment should be held before the executing task [10]. Communicating regularly by having a safety meeting or toolbox meeting on sites can make the safety issues properly reconciled [4]. Management should provide a channel of communication between workers to participate in problem-solving on the construction site. Plus, the processes of problem-solving would enhance safety performance on-sites.

The result of the complex interaction between human errors and job safety might produce a high level of safety performance if thoroughly understood. When focusing on one aspect of performance,
the result might be misleading in explaining the phenomena. As such, by studying the relationship between human errors factors such as workers attitude and communication skills toward safety performance will assist the site management in dealing the human issues. Capitalizing from the Theory of Planned Behaviour [8], a theoretical model as in Figure 1 will be the basis of this study.

![Figure 1](image.png)

3. Research Methodology
The quantitative approach has been applied in this study. The respondents were site personnel consist of the project manager, site supervisors, and safety officer. The questionnaires were designed based on the elements of the variables where the underlying theory applied is the Theory of Planned Behaviour [8]. The questions which designed to be simple and brief were constructed in three parts; (1) workers attitude, (2) communication skills and, (3) safety performance. A pilot test was conducted involving 30 workers to test the suitability, validity and reliability of the questions. The data were records and reports and results of the questionnaires.

When selecting the sample for the main study, a mix of construction participants with a different background was randomly sampled to minimize the possibility of bias. As a result, three main categories of construction stakeholders were involved: (i) clients; (ii) contractors including, main contractors and sub-contractors; and (iii) consultants. The questionnaire was issued to 160 potential respondents, and 113 completed questionnaires were returned. The data were analysed using the Statistical Package for Social Science Version 20.0.

4. Results and discussion
4.1. Reliability (Cronbach’s alphas)
Reliability is the consistency of measurement over a variety of conditions in which the same results should be attained. The refinement of the scale requires the computing of reliability coefficients (Cronbach’s alphas). A Cronbach’s alpha value of 0.7 or above is considered to be a criterion for demonstrating the strong internal consistency of established scales whereas the value of 0.6 and above in the case of exploratory research is also considered as significant.

Overall, the Cronbach’s Alpha for all variables had achieved above 0.6. Table 1 shown the highest Cronbach’s Alpha value is workers attitude (WA) ranging from 0.75 to 0.87 whilst Cronbach’s Alpha for another independent variable; communication skills (CS) is 0.86. For safety performance, the value for Cronbach’s Alpha in the table shows 0.84. In conclusion, the result showed that the instrument to measure those variables are valid and reliable.
Table 1. Reliability Test (Cronbach’s Alpha).

| Variables               | No of item | Cronbach’s Alpha |
|-------------------------|------------|------------------|
| Workers attitude:       |            |                  |
| Worker conditions       | 5          | 0.87             |
| Job content and satisfaction | 6      | 0.85             |
| Work group              | 4          | 0.83             |
| Commitment              | 2          | 0.79             |
| Benefits                | 3          | 0.82             |
| Communication skills    | 9          | 0.87             |
| Safety performance      | 5          | 0.84             |

4.2. Findings

Actions toward safety are dictated by the workers’ attitude that responds accordingly to the surrounding. Table 2 shows, the mean (m) and standard deviation (s.d.) of items in measuring workers attitude among construction’s workers. Based on the reported result in Table 2, the score for workers conditions was (m= 4.03, s.d.= 0.61), job content and satisfaction (m= 3.88, s.d.= 0.58), work groups (m= 3.86, s.d.= 0.66), commitment (m= 4.02, s.d.= 0.64) and lastly the score for benefits (m= 3.86, s.d.= 0.75). The highest item from the result is workers condition which indicates that the respondents are feeling satisfactory at their working area such as the availability of Personal Protective Equipment (PPE). This could be, because all respondents were local workers and had similar lifestyle. This could assist in designing proper equipment suitable for all users. Apart from that, the workers are committed to the objective of their company and understood their responsibilities towards achieving those objectives. Other variables such job satisfaction, working group and benefits are moderately satisfactory. The result show that respondents were lack of team works, and when working in one team the team members do not have any willingness in providing ideas for safety rules or technique improvement. The achievement when the respondents work in group was not satisfactory. The result indicates that the attitudes of the respondent are moderately satisfied.

Table 2: Mean and standard deviation for workers attitude.

| Item                        | Mean  | Standard deviation |
|-----------------------------|-------|--------------------|
| Workers conditions          | 4.03  | 0.61               |
| Job content and satisfaction| 3.88  | 0.58               |
| Work groups                 | 3.86  | 0.66               |
| Commitment                  | 4.02  | 0.64               |
| Benefits                    | 3.86  | 0.75               |

Table 3. Mean and standard deviation (s.d.) for communication skills.

| Item                                                      | Mean  | s.d.  |
|-----------------------------------------------------------|-------|-------|
| I can speak freely to all the workers on any topics.      | 3.93  | 0.77  |
| All workers are willing to listen to my ideas.            | 3.77  | 0.80  |
| My site supervisor has excellent interpersonal skills.    | 3.96  | 0.82  |
| There are good communication between me and my site supervisor. | 3.96  | 0.78  |
| There are no barriers towards efficient communication.    | 3.99  | 0.73  |
| I usually got plenty of time when important things happen in the work place. | 3.91  | 0.78  |
| Project manager communicate clear objectives for the company to achieve. | 3.97  | 0.76  |
| My project manager is willing to help me when I have questions. | 4.09  | 0.73  |
| All employees always share information and ideas about managing safety at the workplace. | 4.05  | 0.72  |
Proper communication line ensuring messages are soundly delivered to the intended recipient. Not only are the medium of communications but skills also required to deliver those messages efficiently and effectively. From Table 3 the result indicates that the communication skills in the construction industry are moderately satisfied. The highest mean for the item my project manager is willing to help me when I have questions and all employees always share information and ideas about managing safety at the workplace which is m= 4.09 (item 8) and m= 4.05 (item 9). This shows that the company had taken some effort to take care of and train their workers. Then, the lowest value of mean for the item all workers are willing to listen to my ideas which is m= 3.77 (item 2). Age, in this case, is seniority, represents the ability and efficiency of communication among the workers to do their work and share knowledge among them in more effective and efficient. It has been well established in Western and Asian samples that age associated with employee work well being [9].

Table 4: Mean and standard deviation (s.d.) for safety performance.

| Item                                                                 | Mean | s.d. |
|----------------------------------------------------------------------|------|------|
| What will you rate your safety performance at the workplace?        | 4.00 | 0.64 |
| What will you rate the praise you accept for a job well-done?       | 4.06 | 0.80 |
| How would you rate your understanding about how your safety performance is appraised? | 3.96 | 0.66 |
| Do you receive constructive feedback about your safety performance?  | 3.89 | 0.77 |
| How would you rate the organization for providing equipment and tools you need to improve your safety performance? | 4.08 | 0.80 |

In the Table 4 shows the detailed result about mean and standard for safety performance the highest mean is m= 4.08 (item 5) for how would you rate the organization for providing equipment and tools you need to improve your safety performance? Then followed by what will you rate your safety performance at the workplace? m= 4.00 (item 1). The lowest value for mean is the item do you receive constructive feedback about your safety performance which the value m= 3.89 (item 4). The results indicated that high levels of support at both organizational and supervisor levels reflecting care and concern for the well-being of workers led to a good safety performance among workers [1]. Plus, this result shows that the safety performances among the respondents are moderately satisfied for the construction industry.

4.3. Correlation

To determine the correlation between the variables; the data is analysed using the bivariate correlation i.e. Pearson correlation and the result is represented in Table 5. The result will show the correlation between independent variables which are workers attitude and communication skills and dependent variable which is safety performance. The Pearson number of the correlation between the entire elements should value between -1 to +1. In order to determine the direction, the sign of positive and negative should be looking into [10]. The result shows there is a positive correlation between workers attitude and safety performance and the same with the independent variable communication skills and safety performance dependent variable; both are positively correlated. The guidelines to determine the strength of the relationship: (i) $r = 0.10$ to $0.29$ small; (ii) $r = 0.30$ to $0.49$ medium; (iii) $r = 0.50$ to 1.0 large [10]. The highest correlation is between workers attitude and safety performance as it shows the Pearson correlation is ($r = 0.81$). This shows that both of the variables have a strong relationship with each other. Then, the correlation between communication skills and safety performance where the result of Pearson correlation is ($r = 0.75$), which shows that the workers’ attitude has the strongest correlation with the safety performance. The implication from this result is that workers attitude or safety attitude can possibly predicting the likelihood of accident rates, at such, proactive corrective action should be taken [11]. The result also shows that correlation between communication skills and
safety performance is stronger than the correlation between workers attitude and safety performance. Communication skills such as an open free-flowing exchange about safety-related issues significantly influenced accidents attributions [11]. Therefore, besides workers attitude communication skills also included as the influenced to safety performance at the construction site.

Table 5. Correlation matrix of workers attitude, communication skills and safety performance.

|                        | Workers attitude | Safety performance | Communication skills |
|------------------------|------------------|--------------------|----------------------|
| Workers attitude       | Pearson Correlation 1 | 0.814*             | 0.786*               |
|                        | Sig. (2-tailed)   | 0.00               | 0.00                 |
| Safety performance     | Pearson Correlation 0.814* | 1                   | 0.753*               |
|                        | Sig. (2-tailed)   | 0.00               | 0.00                 |
| Communication skills   | Pearson Correlation 0.786* | 0.753*             | 1                    |
|                        | Sig. (2-tailed)   | 0.00               | 0.00                 |

*Correlation is significant at the 0.01 level (2-tailed)

4.4. Testing hypotheses using regression

Regression study was used to find out whether the independent variable which are workers attitude and communication skills have a significant effect on the dependent variable, which influences the safety performance among construction workers. The result is shown in Table 6 below.

Table 6. Result of regression analysis.

|                        | Unstandardized Coefficients | Standardized Coefficients | Collinearity Statistics |
|------------------------|-----------------------------|---------------------------|-------------------------|
|                        | B                           | Std. Error                | Beta                    | t             | Sig. | Tolerance | VIF  |
| Workers attitude       | 0.986                       | 0.057                     | 0.808                   | 17.242        | 0.000 | 1.000     | 1.000 |
| Communication skills   | 0.842                       | 0.059                     | 0.752                   | 14.349        | 0.000 | 1.000     | 1.000 |

a. Dependent variable: influence to safety performance among construction’s workers

R square = 0.696   F value = 119.056   Sig F = 0.000   Durbin Watson = 1.860

From Table 2 shows that workers’ attitudes have stronger influenced towards safety performance of construction’s workers compare to communication skills. Both variables are significantly influencing the dependent variable, safety performance. VIF and Tolerance are acceptable meant that no collinearity issues in the model. From the analysis, the R² is 0.696 which implies that workers attitude and communication skills have explained 69.9% of the variation in term of factors influencing the safety performance among construction’s workers. This meant that result from this study has an average explanation towards influence on safety performance among construction’s workers and the remaining 30.1% should be explained by other factors. Overall, these independent variables can predict the safety performance, and managers might apply this finding to control hazard and risk, i.e. occupational injuries as well as improvise communication skills to improve site safety management. Table 7 shows the summary of regression results.
Table 7. Summary of regression result.

| Hypothesis | Statement                                                  | Result |
|------------|------------------------------------------------------------|--------|
| H1         | There is a positive influence of workers attitudes toward safety performance | Accepted |
| H2         | There is a positive influence of communication skills toward safety performance | Accepted |

5. Conclusion and Recommendation

In this current study, the objectives have been achieved where it was found that among the influencing cluster of factors determining the success of a safety performance the most influential was the workers’ attitude and communication. They are all concerned with the need for management to get their employees more knowledgeable and informed about safety issues. Better design and application equipment and personal protective equipment (PPE) could contribute to a higher quality of work. Employers could also consider reducing manual work for future improvements in the safety and health of their employees. Awareness of the right use of equipment or tools and wearing the PPE properly can reduce risks. A proper channel of communication, as well as message delivering skill, should be emphasized to improve site safety management.

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