The Influence of Safety Posters on Employee Compliance in Creating a Culture of Workplace Safety and Health in the Construction of Serbaguna Community Centre Sidoarjo Building

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Abstract. Multi-story building construction project may pose a high rate of risks especially to worker safety, thus developing workplace health and safety is an urgent matter to take notice of. Workplace safety is an effort in protecting employees from any harm from a workplace accident, and in avoiding violation against government laws and regulations. The objective of this study was to examine the influence of safety posters on employees’ effort and compliance in developing workplace health and safety at the construction of “Serbaguna Community Centre Sidoarjo” building. This study used the experimental method in which the respondents were the aluminium composite panel (ACP) and scaffolding installation workers. The data was collected based on observation employing a checklist. The data were analysed using paired sample t-test. The result of the study was that the safety posters had a significant impact on the employee’s compliance (t-score > t-table) with α=5%. This result indicates that safety posters are able to improve employees’ consistency in behaving safely within the work environment.

1. Introduction
The multi-story construction project is subject to a high rate of risks since the activities are oftentimes restricted by the agreed cost, time and quality [1] [3]. As a consequence, contractors are required to work professionally, when in fact, their concern about workplace health and safety is relatively low. This is so unfortunate since human resources are the company’s valuable asset. The statistics of work-related accidents is suspected not to represent the actual incidents happened, which is more. Work-related accidents can impact the various significant economic loss. Among construction activities, working at height is one of the most dangerous works because it is more likely to cause permanent disability or even death [2]. The said risks are typically prompted by the negligence of using personal protective equipment stated in the occupational health and safety regulations. There were several infelicities found during observation, some of which the workers were rarely seen in the safety gears provided. Also, they also seem to neglect the workplace sanitary. Therefore, the objective of this study serves as an effort to put workplace health and safety into practice within the construction site of “Serbaguna Community Center Sidoarjo” Building. Poster, as the treatment, was put up in order to raise
awareness amongst the workers working at height specifically the ones installing aluminium composite panel (ACP).

2. Literature Review

2.1. Poster

The poster is a visualisation displayed as an announcement, caution, or persuasion typically in forms of graphics [5]. It is an image combining visual elements, such as lines, graphics, and texts intended for drawing attention and covying a message concisely [9]. It is a visual combination of strong design using colours and messages designed for catching the attention of passersby long enough to put emphasis to and instil a meaningful idea in their memory [7][8].

It can be concluded from the variety of opinions stated earlier that poster is a type of media containing written message, either in the form of graphics or texts intended for drawing people’s attention so that the message can be delivered and accepted with ease. The functions of the poster are as follows [9]:

- Motivating employees. Poster serves a purpose as a reminder to encourage and motivate employees compliance.
- Warning. It contains reminders to implement the rules.
- Creative experience. Producing an idea, story, or composition of the poster to display can lead to more creative activities.

According to Sadiman, the characteristics of a good poster are simple, serving one idea to achieve one primary goal, and using vivid colours, clear slogan, clear prints, a variety of patterns and texts, in a relatively large size: A3 or bigger [5].

2.2. Workplace Health and Safety

Workplace safety is a series of attempts to foster a safe and healthy work environment for employees of the company [11]. It is human attempts to prevent the company, employees, society, and natural environment from any harming incidents.

There are two approaches in workplace safety: modern safety approach and operational approach. Modern workplace safety approach is a combination of both. Industrial safety approach emphasises on the obedience to the occupational health and safety regulations and the use of personal protective equipment, while operational approach emphasises more on the operations involving hazardous materials which are processed using specific operational parameters, such as temperature, pressure, flow, and others [12].

Occupational health, according to ILO and WHO, is an attempt to maintain and improve employee’s physical, mental, and social well-being to the highest degree. Every work component can be the source of harm to employee’s health either in the form of injury or physical or mental health problems. The primary purposes of occupational health are:

- Maintenance and improvement of employee’s health and working capacity
- Increase in the working environment to become conducive for occupational health and safety
- Developing work organisation and working culture toward the ones which are supportive of workplace health and safety.

2.3. Compliance
Compliance is an attitude, an act to always follow the rules. Employee compliance is the key to preventing work-related accidents. Non-compliant attitude has to be curbed by giving warning to the workers who violate the regulations or to the workers who disrupt others [11]. Good compliance is reflected on workers’ spirited behaviour and responsibilities for the work; also on having high solidarity among co-workers.

3. Research Methodology
The study was done in the construction of “Serbaguna Community Centre Sidoarjo” building, especially in engineering facade using Aluminium Composite Panel (ACP) and scaffolding installation. The experimental method was utilised, with work safety posters being the treatment variable and the worker's compliance being the dependent variable. The themes of the posters were appeals for prioritizing safety (poster 1), using safety gears (poster 2), reporting any damage (poster 3), checking safety harnesses (poster 4), protecting their valuable possessions (poster 5), believing that the risk is not worth their life (poster 6), checking protective equipment (poster 7), and putting on helmet (poster 8). The display location is detailed in Figure 3.

Observation as the data collection technique used in this study employed a checklist to measure the worker's attitude. The dependent variables were the use of personal protective equipment (PPE), work method and the working environment. Likert scale was employed to measure workers compliance with four response categories: 1 - never, 2 - rarely, 3 - often, and 4 - always. The indicators of workers compliance are described in Table 1. The research respondents were 25 workers selected by simple random sampling. The observation of workers attitude was done three times before and after the treatment, with time interval of 14 days (refer to Figure 1 for more details). The validity and reliability of the instrument was assessed before it was put to use. The validity value with $\alpha=5\%$ was $t$-score $> t$-table ($11.281 > 1.782$) which is generally taken to indicate that the instrument was valid. The reliability value with $\alpha=5\%$ was $r$-score $> r$-table ($0.989 > 0.514$) which is usually taken to show that the instrument was reliable. Equation 1 is the statistical formula used in the analysis of the paired t-test, in which the symbol ‘n’ represents the total number of individuals in the sample, the symbol ‘$d_i$’ represents the difference in post-test and pretest scores, and the symbol ‘t’ represents the value of t score.

$$t = \frac{\sum d_i}{\sqrt{\frac{n \sum d_i^2 - (\sum d_i)^2}{n-1}}}$$

### Table 1. Observation Indicators

| FACTOR                        | INDICATOR                                                                 |
|-------------------------------|---------------------------------------------------------------------------|
| Personal Protective Equipment | Wearing helmet, goggles, waistcoat, shoes, mask, gloves, and body harness. |
| Work Method                   | Carrying out work procedures well on the installation of ACP and panels.   |
| Working Environment           | Reporting any damage in the work area                                      |
|                               | Maintaining cleanliness of the work area                                   |
|                               | Care to the safety of the work area                                        |
|                               | Feeling while working                                                      |
| Source: company document       |                                                                           |
4. Result and Discussion
The characteristics of the respondents in this study are presented in Table 2, 3, and 4, which in general indicate that the respondents are of sufficient age, have an adequate level of educational attainment and working experience. 96% of the respondents are under 45 years old which falls in the working age population. By the statement of the Department of Labor, younger workers are more productive than the older ones. When it comes to the awareness of workplace safety and health, the level of education plays an important role [6]. With 64% of the respondents have attended high school (SMA) / vocational high school (SMK), raising the awareness is assumed not to be a problem. 68% of them have more than five years of working experience. Workplace safety and health is closely tied to the duration of working
experience [11]. Work-related accidents in Hong Kong which resulted in injuries on hands happened to the workers with less than one year of experience [6].

| Table 2. Age | Table 3. Education | Table 4. Experience |
|--------------|---------------------|---------------------|
| Age          | Percentage (%)      | Education           | Percentage (%) |
| (years)      |                     | SMP                 | 36            |
| 18-25        | 32                  | SMA/SMU             | 64            |
| 26-35        | 52                  |                     |               |
| 36-45        | 12                  |                     |               |
| 46-55        | 4                   |                     |               |

As presented in Figure 4, the sample was given occupational health and safety test. Comparing Observation 1 to Observation 2 with $\alpha=5\%$, the value of t-score was less than t-table (-0.44<1.771). This means that there was no significant difference between their safety attitudes on both occasions. Comparing Observation 2 and Observation 3, the value of t-score was once again less than t-table (0.569<1.771). Since there was no significant difference between the worker's safety attitudes on the first and third observation, which was 42-day apart, treatment in the form of the poster was given. Another observation was done seven days afterwards. The value of t-score was higher than t-table (11.5>1.761) resulted from comparing the post-test scores to the mean of the pretest scores on Observation 3 and 4. The mean of Observation 4 being higher than the mean of Observation 3 (2.74>2.40) also indicated that poster as the treatment had given significant impact on the worker’s safety attitude. Comparing Observation 4 and Observation 5, the value of t-score was also higher than t-table (3.565>1.771), and so was on Observation 5 and 6, with t-score = 1.995 and t-table = 1.771. The significant difference between t-tests means of Observation 4, 5, and 6 (2.74, 2.815, and 2.835) also indicated that the worker’s safety attitudes kept getting better on every observation after the treatment. This was a sign of positive impact the posters gave the workers.

5. Conclusion
This study concludes that the provision of work safety posters in the construction of “Serbaguna Community Centre Sidoarjo” building had a positive impact on workers regarding occupational safety behaviour (11.5 > 1.771). It is expected that the construction project will continue to provide posters as
an attempt to create a culture of safety at work. In addition, supervision of the implementation of workplace health and safety which includes safety patrol, safety supervisors, safety meetings and reporting the handling of work-related accidents are still carried out as planned.

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Acknowledgement
The writers sent their gratitude to the contractors of PT. Bangun Kubah Sarana – PT. Indokon Raya, KSO for permitting the study to be carried out in the construction of “Serbaguna Community Centre Sidoarjo” building.