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The Effects of Safety Training Practice in Influencing Safety Performance

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Abstract

Recently, the issues surrounding workplace safety have attracted attention all over the world. In responding to this issue, numerous studies have been done, yet workplace accidents remain at a critical level. In Malaysia, statistics have shown that the number of workplace accidents is very high, especially in the manufacturing industry. Given the criticalness of workplace accident, the researcher conducted this research in the steel and iron companies that reported the highest numbers of accidents in Malaysia. The aim was to address the issues of workplace safety and the effects of safety training practice on workplace safety performance.

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Introduction

With the rapid revolution of the countries all over the world in pursuing countries' development, globalization has become the focal point of every country around the world (Tharaldsen *et al.*, 2010). Nevertheless, the results of globalization had impacting the occurrence of problems within the workplace safety (Li *et al*., 2009). Due to that, issues surrounding workplace safety have generated ever increasing attentions among the researchers which made it a headline all over the world (Wameedh *et al.*, 2011). As the evidences, within the period of years 2011/2012, there were 591000 cases of non-fatal injuries reported in United Kingdom (Health and Safety Executive, 2012a). Turning into United States, there were records of 760000 workplace accidents reported during 2011 (U.S. Bureau of Labor Statistics, 2012). Looking onto the trend of workplace safety, it was suggested that there is a decreasing trend in workplace accidents in United Kingdom (Health and Safety Executive, 2012b). In light of these critical numbers, issues concerning safety have become a central issue for researchers (Choudhry *et al.*, 2009; Wameed *et al.*, 2011; Shang and Lu, 2009).

Literature Review

Safety Training Practice

Generally, safety performance is affected by employees' perception influenced by safety education (Kwon and Kim, 2013; Health and Safety Executive, 2011). Furthermore, Gyekye and Salminen (2009) proposed that perception of employees towards workplace safety will be influenced by safety education, which includes safety training practices that providing necessary information in assisting the employees to develop the required skills and knowledge as a whole. In defining safety training, it refers to the investment made by the organizations bidding to ensure the safety at work through behavioural changes. (Yang *et al.*, 2010; Wrede, 2009; Mohammad Fam *et al*., 2012).

Equipping employees with required knowledge and skills, safety training practices enables employees to perform their daily tasks safely and competently (Sari, 2009; Antonio *et al.*, 2013; Bahari, 2013; Harrington and Walker, 2005). Due to this, safety training practice function as a major practice in reducing workplace incidents, with the ultimate goals to increase safety performance. (Wameedh *et al*., 2011; Health and Safety Executive, 2011; Burke *et al*., 2011; Choudry *et al*., 2008). Referring to previous studies (Arcury *et al*., 2012; Hinze, 2005; Hassanein and Hanna, 2008; Chen and Jin, 2012; Wameedh *et al*., 2011) reviewed so far, it is understood that safety training practices acquired effects in affecting safety performance which proposed that workplace safety performance can be improve through improving safety training practices at work.

Turning into the dimensions of safety training practices, it can be seen that safety training practices are occasionally listed under safety performance (Wu *et al*., 2007; 2008). Nevertheless, as the researchers have suggested that safety training practices possessed influences on safety performance, it was hence suggested safety training practices shall become a factor in predicting safety performance (Sari, 2009; Antonio *et al.*, 2013; Wameedh *et al*., 2011; Burke *et al*., 2011; Choudry *et al*., 2008). An exploratory factor analysis recently conducted by Bahari (2013) has been conducted in determining the dimensions of safety training practices. The results of the exploratory factor analysis conducted indicated that there are three dimensions of safety training practices, knowledge and skill transfer, safe work practices, and safety and risk understanding.

Baldwin and Ford (1988) suggested, transfer of training referred to what extend the learners, whose are the employees apply KSAs learned from the training into the workplace. To extending the ideas of Baldwin and Ford, Bahari (2013) proposed that the degree of transfer is actually influenced by the perception of employees towards the safety training, positive perception ensure a positive training transfer, and vice versa. Meanwhile, the safety-related information provided during the safety training enables employees to gain the information of safety best practices that ensures them to perform their jobs safely, in order to achieve safety outcomes (Goetsch, 2010). Safety training also equipped employees the understanding on safety and risk issues that enables them to identify the hazards and to prevent accidents from happening (Bahari, 2013).

Safety Performance

Safety performance is a subsystem of organizational performance (Wu *et al.*, 2008; Tharaldsen *et al.*, 2010). Wameedh *et al.* (2011) proposed that there are many factors that can influence safety performance, for instance, organizational (safety leadership, safety training practices), and psychological factors (safety climate). Recent evidence (Chen and Jin, 2012; Choudhry *et al*., 2009; Yang *et al.*, 2010) suggests that safety performance should be measured by using proactive and reactive indicators. Reactive indicators are incident rates and compensation costs, whereas proactive indicators are safety behaviour and hazard identification (Chen and Jin, 2012; Wu *et al.*, 2008; Powell, 2009).

The measuring of safety performance has arose as a focal point in the academic field for the past 50 years, which the statistical rates of accidents occurred had been conventionally used as the indicator (Kjellen, 2009; Roelen and Klompstra, 2012). Since then, the expansion of safety performance indicators had been an open issue that attracted high interests among researchers who are in the field of workplace safety (Roelen and Klompstra, 2012). Thus, the myths aroused on the generalization of the safety performance indicators in different fields, organizations, and the reliability of the indicators in measuring safety performance in the workplace (Roelen and Klompstra, 2012).

Several attempts have been made to measure safety performance and results revealed that safety performance consists of two dimensions, safety compliance and safety participation. (Zohar, 2008; Yang *et al.*, 2010; Martinez-Corcoles *et al.*, 2012; Brondino *et al.*, 2012). The traditional dimensions proposed by Borman and Motowidlo (1993) suggested the used of task performance and contextual performance; which addressed as safety compliance (task performance) and safety participation (contextual performance). Tharaldsen *et al.* (2010) as well as Kwon and Kim (2013), reported that safety compliance refers to compliance towards rules and regulations while safety participation can be defined as the engagement towards safety issues.

However, alongside with the development of the technology, it has been made known that the measurement for safety performance can be pigeonholed into two categories, reactive and proactive indicators (Choudhry *et al.*, 2007; Cooper and Philips, 2004; Chen and Jin, 2012). The differences between reactive measurement and proactive measurement in the measuring point in time, pre (proactive) and post (reactive) accidents (Chen and Jin, 2012). Reactive measurements highlight on the post-accidents evaluation, such as accident rates, costs of compensation which are less dependable (Cooper and Philips, 2004; Choudhry *et al.*, 2007) while proactive measurements focus on the pre-accidents measurements, the safety climate, hazard identification, and employees' behaviours and attitudes, in order to prevent accidents from happening (Chen and Jin, 2012). Succeeding to the discussion, a conceptual framework of this study has been developed.

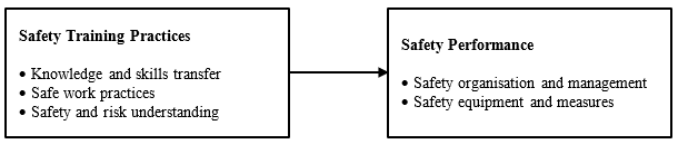

Fig. 1. Conceptual Framework Arial 8

H1: *The higher the safety training practices, the higher the safety performance.*

Methodology

This research shall be a quantitative research. According to Creswell (2002), a quantitative research refers to research that measures causal relationships, hypotheses testing, and theories testing using survey as data collection instrument. Creswell further proposes that quantitative research should be used in research which contains a large amount of statistical data. Furthermore, the design of this research is descriptive. Elifson (1998) proposes that descriptive study describes the characteristics of the desired trends or situations. Descriptive study helps the researcher understand the phenomena and intercorrelation between the variables (Sekaran and Bougie, 2009).

Respondents of this study will be employees from the iron and steel based manufacturing companies chosen from Federation of Malaysian Manufacturers (FMM) directory. A major reason for selecting these industries is that the number of accidents which occur in these industries is the highest among all other manufacturing industries, with an accident occurring every two working hours in Malaysia in 2011 (Social Security Organization, 2011). In this study, probability sampling technique was chosen considering the generalization of probability sampling results (Teddlie and Yu, 2007).

In this research, it is apparent that the questionnaire is an adaptation of questionnaires from and Wu *et al.* (2008) as well as Safety Training Impact Scale (Bahari, 2013). In order to measure safety training practice, the Safety Training Impact Scale developed by Bahari. (2013) shall be adopted. Meanwhile, adoption of Wu *et al.*'s (2008) Safety Performance Scale shall adopted to explore the findings of safety performance. The adoption of Wu *et al.*'s questionnaires in the measurements of dependent variable, and the adoption of Bahari's (2013) questionnaire in measurements of independent variable are due to the proven high reliability of the questionnaires (Alpha Cronbach: 0.84 to 0.97) (Shah Rollah, 2011; Wu *et al.*, 2008; Bahari, 2013).

Turning into the validity of the adopted questionnaire, principal components analysis was done on both safety training practice and safety performance. Yong and Pearce (2013) suggested that Kaiser-Meyer-Olkin (KMO) of each construct shall be hihger than 0.6 in order to be valid. Referring to the results of PCA (principal components analysis), both safety training practice and safety performance have obtained the Kaiser-Meyer-Olkin values of 0.928 and 0.918 respectively. While Yong and Pearce (2013) proposed that KMO values of 0.9 indicates excellent sampling adequacy, it indicates that the research instruments of this study is valid.

Hence, the research instruments of this study will be developed by adoption of Bahari's (2013) Safety Training Impact Scale and Wu *et al.*'s (2008) Safety Performance Scale. Safety Training Impact Scale shall consists of the dimensions of knowledge and skills transfer, safe work practices, and safety and risk understanding while Safety Performance Scale consists of dimensions of safety organization and management and safety equipment and measures. Among the dimensions of safety training practices, both knowledge and skill transfer and safe work practice consist eight items respectively while safety and risk understanding consists five items. Whereas, each dimensions of safety performance consists ten items. All of the items will be ranked by the respondents using Likert's Scale ranging from one to five. The data collected will be analyzed using PASW Statistics Data Editors version 18.0 as well as AMOS version 20.0.

Results

Throughout the data collection, a total of 385 sets of data were collected. The collected data were input into PASW Statistics Data Editors and analyse using SEM AMOS. Analysis of measurement model was ran using AMOS and the initial model fit were RMSEA: 0.104, CFI: 0.874, and ChiSq/df: 5.166. Referring to the references, in order to achieve absolute fit in measurement model, root mean square of error approximation (RMSEA) shall be less than 0.08 while a range between 0.05 to 0.1 is acceptable (Browne and Cudeck, 1993; Awang, 2012). Nevertheless, to achieve incremental fit, comparative fit index (CFI) shall higher than 0.9 (Bentler, 1990) while parsimonious fit is achieve when ChiSquare divided by degrees of freedom (Chisq/df) less tha 5.0 (Marsh and Hocevar, 1985). As all of the three fits were not achieved, modification indices were examined and redundant items were deleted one at a time until model fit were achieved. The final measurement model showed the model fit indexes of RMSEA: 0.79, CFI: 0.96, Chisq/df: 3.392. Referring to the model fit indexes, absolute fit, incremental fit, as well as parsimonious fit were achieved. The RMSEA of measurement model in this study recorded 0.79, which is lower than 0.8, hence absolute fit was achieved. Furthermore, incremental fit was achieved when the comparative fit index of the measurement model recorded 0.96, which is a goof fit. Turning into the

parsimony fit, Chisq/df values of the final measurement model recorded 3.392, well below 5.0, hence parsimony fit was also achieved. The final measurement model is shown below:

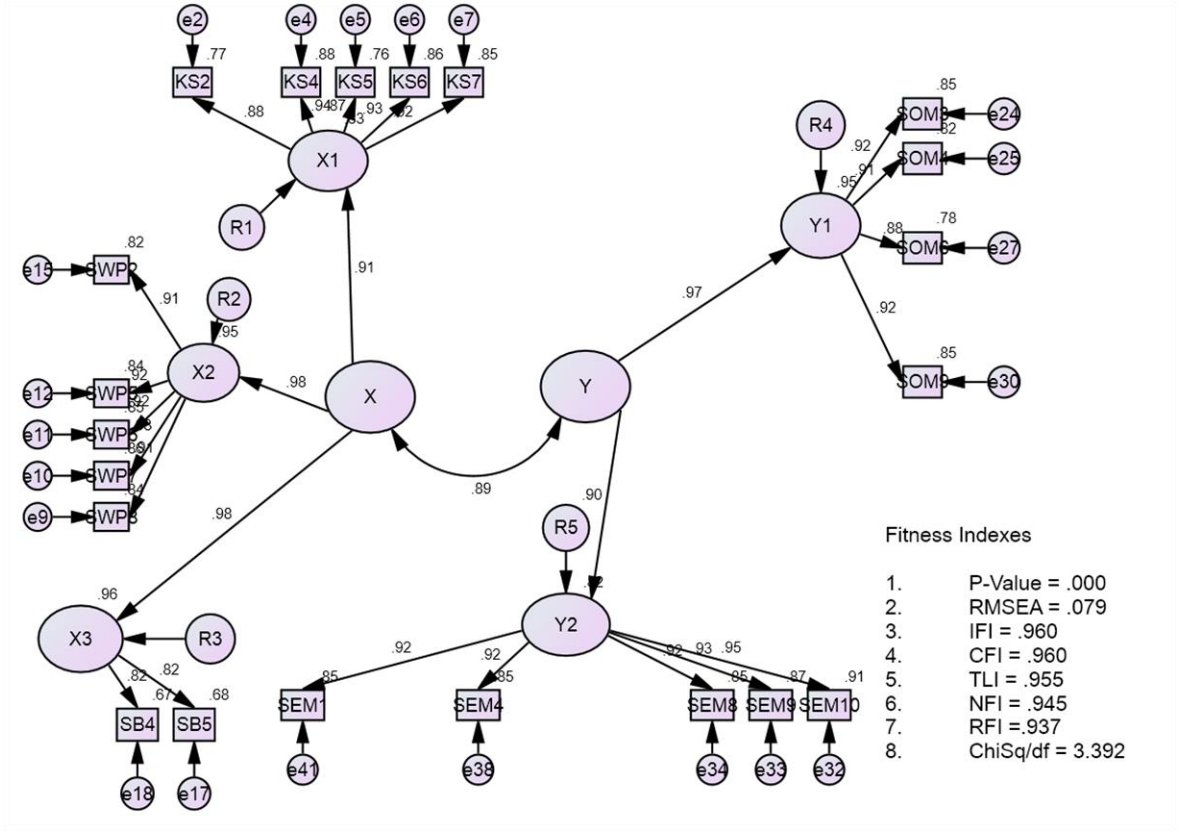

Fig. 2: Measurement Model

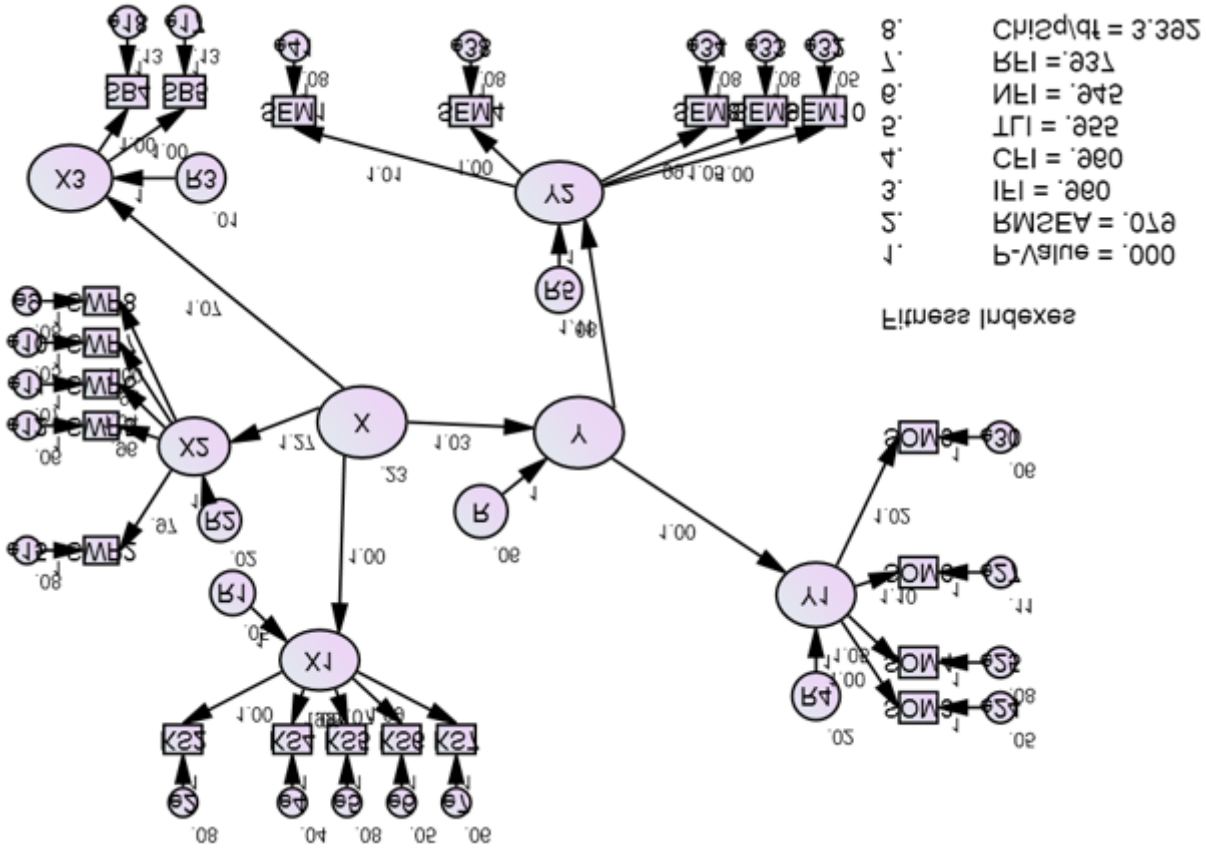

Fig. 4: Structural Model

Turning into, reliability, the data collection instruments were proven to be reliable as the Alpha Cronbach of safety training practice is 0.984 while Alpha Cronbach of safety performance is 0.990. Awang (2012; 2015) suggested that composite reliability is achieved when CR value is 0.6 and higher while average variance extracted is achieved when AVE value is 0.5 and higher. In this research, the CR value of safety training practice is 0.980 while AVE value is 0.807. As for safety performance, the value of CR is 0.980 while the value of AVE will be 0.847. Thus, all three level of reliability have been achieved in this research. Next, the validity of this research was examined. In structural equation modelling, there are three levels of validity, convergent validity that required AVE value of 0.5 and higher, construct validity, which is achieved when all fitness indexes were achieved and discriminant validity, which achieved when the model is free from redundant items. In this research, the AVE value of both safety training practice and safety performance are higher than 0.5, yet the fitness indexes of absolute fit, incremental fit and parsimonious fit were all achieved as discussed above. Nonetheless, the model is free from redundant items. Therefore, all three convergent, construct and discriminant validity have been achieved. The discriminant validity index summary is shown in Table 1.

Table 1: Discriminant Validity Index Summary

Construct	**X1**	**Y**
X1	**0.898**	
Y	0.893	**0.920**

Next, the measurement model was assembled into structural model with the purpose to test the hypothesis. The structural model of this research is shown in Figure 4. Structural model is assembled with the purpose to execute the path analysis which in turn test the hypothesis of this research. The hypothesis of this research is *the higher the safety training practices, the higher the safety performance.* The result of path analysis is shown in Table 2:

Table 2: The Regression Weight for X in predicting Y

			Estimate	S.E.	C.R.	P
Y	<---	X	1.03	.055	18.861	***

***indicates a highly significant at <0.001

Table 2 shows the regression weight for safety training practice in predicting safety performance. Refers to the results, when X goes up by 1, Y goes up by 1.03. In other words, when safety training practice goes up by 1, safety performance goes up by 1.03. Furthermore, the probability of getting a critical ratio as large as 18.861 in absolute value is less than 0.001. In other words, the regression weight for **X** in the prediction of **Y** is significantly different from zero at the 0.001 level (two-tailed). Therefore, the above research hypothesis is supported. In conclusion, the better the safety training practice, the better the safety performance.

Conclusion

In conclusion, this study supported the important constructs of safety training practice in affecting the safety performance in the workplace. Which the results of the analysis indicated that safety performance affected by safety training practice with the regression weight of 1.03, it is proven that safety training practice is vital in influencing safety performance at the workplace in Malaysia. Nevertheless, this research also proven that the dimensions of knowledge and skills transfer, safe work practices, and safety and risk understanding can effectively improve the health of safety performance at the workplace. Furthermore, the perception of employees towards the adequacy of safety training practices provided within the organization does influence the employees' safety performance. The outcomes of this research highlights the importance of organizations in providing suitable and adequate safety training practices efforts in equipping the employees with safety-related knowledge and skills, as well as behavior in ensuring desired safety performance.

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