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WORPLACE SAFETY IMPROVEMENT IN SME MANUFACTURING: A GOVERNMENT INTERVENTION

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Abstract

Workplace accident in Malaysia shows an increasing trend in recent years with the SMEs sector is found to contribute 80-90% of the total number of accidents. Poor levels of occupational safety and health compliances within the SME manufacturings is determined to be the main cause of accidents. The underlying factors towards the compliance failures are financial constraint, lack of knowledge and expertise, limited human resources and inexistence of knowledgeable safety personnel. Therefore, the Department of Occupational Safety and Health

Malaysia conducted an intervention programme with the objective is to improve the compliance of OSH within SME manufacturings. A total number of 59 SME manufacturings within Negeri Sembilan were selected based on their poor grading in OSH Compliance audits and a specific design intervention in the form of trainings then was conducted. The results of OSH compliance post-audit showed an improvement of 38% as compared to the pre-audit. The T-test analysis result also indicated a significant difference in OSH compliance grading among the participating SME manufacturing companies (P -value <0.01). In conclusion, government intervention conducted by DOSH could elevate OSH compliance performance among the SME manufacturings.

Keywords

Occupational Safety and Health, Safety Intervention, Government Intervention, Safety Compliance, Workplace Accidents.

1. Introduction

In every year, approximately 100 million cases of injury related to work are reported in the world (Leigh et. al., 1999). This scenario proves that industrial accident is a serious problem to be faced by the industrial world (Biggs, Sheahan & Dingsdag; 2005). Among all the nations that suffer from industrial accidents, developing countries are reported to have a higher fatality rate (Takala, 1999) compared to the developed countries. Malaysia is also included in this situation.

Since Malaysia robustly pushes its economic development in recent years, the total number of accidents had gradually increased, even though it once experienced a downtrend from 1999 to 2009 (Maimunah Aminuddin, 2013). Adinegara et. al. (2013) conducted a review on industrial injury within Malaysia and concluded that the fatality rate from 2008 to 2013 was 9.2/100,000 workers which was higher than the U.S. Furthermore, the total number of accidents related to work reported to Social Security Organisation Malaysia is also increasing year by year since 2013 (SOCSSO 2014, 2015, 2016). Figure 1 expressed the recent statistics of total industrial accidents. Furthermore, Figure 2 expressed the total industrial fatality cases in Malaysia's workplaces. This statistic is retrieved from the Department of Occupational Safety and Health (DOSH) Annual Report 2016 (DOSH, 2017).

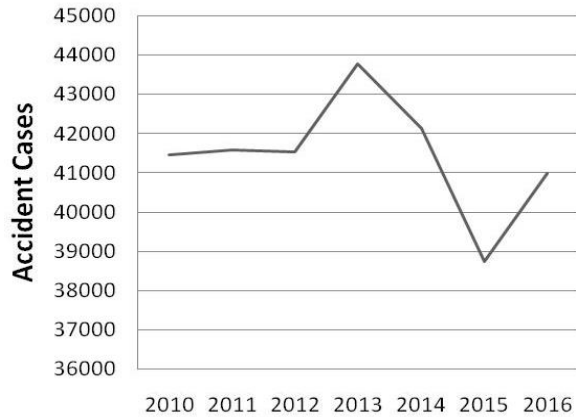


Figure 1: Total of Industrial Accident Cases

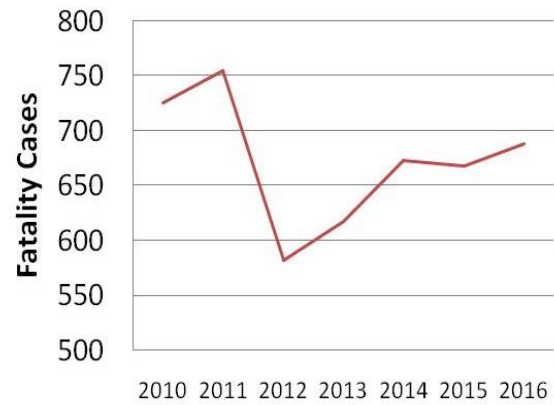


Figure 2: Total of Industrial Fatality Cases

Mentioning about Small and Medium Enterprises (SMEs), its important role in contributing towards the economic development of all nations remains is an undaoubtful facts (Kongolo, 2010). Similarly, the SMEs in Malaysia contribute the highest percentage of the GDP as revealed by the Minister during the launching of SME“ building fundraising”ceremony held in Kuala Lumpur on 13th July 2017. In addition, previous researchers had also recognized the importance of SMEs in contributing the growth of a nation, especially in terms of providing the job opportunities to the people (Omar, Arokiasamy, & Ismail, 2009; Smolarski & Kut, 2009; Saleh & Ndubisi, 2006). Despite its vital contribution towards the national economic development, high cases of workplace accident within the SMEs seemed to throw in a serious problem for Malaysia. In recent years, 80 to 90 percent of industrial accidents and injuries in Malaysia is contributed by the SMEs (Aziz, Baruji, Abdullah, Nik Him & Yusof,2015; Surienty, Hong & Hung, 2011).

Lilis Surienty (2012) cited the finding of Yahaya (2002) in her article saying that the compliance audit performed by DOSH in 2002 had resulted a “poor compliance” level among 2600 SMEs. Lilis Surienty also added that the limitation owned by SMEs especially in terms of financial capacity, expertise in occupational safety and health as well as human capital size refrained the SMEs from achieving good safety practice as compared to huge firms. Furthermore, Baba Md Deros, Ahmad Rashdan Ismail and Mohd Yusri Mohd Yusof (2012) determined that 97% of SMEs in Malaysia do not conform to occupational safety and health

legislations. The non-compliances were caused by the non-existence of knowledgeable safety personnel, limited financial muscles and perceived low workplace risks. In addition, Previous researches also determined that poor OSH level or “safety climate” has a positive relation to high accident (Harpreet Singh, Didar Singh & Bobby, 2017a; Varon&Matilla, 2000) Notwithstanding their significant practical and resource limitations, SMEs are still bound by the OSH legislations and any non-compliance is subject to legal punitive actions. Thus, SMEs must manage their OSH effectively within their limited resources to comply as far as practicable with OSH legislations to prevent the workplace accidents. In addition, most of the workplace accidents within SMEs occurred in manufacturing companies compared to the other sectors such as constructions, services and retails.

Realising their limitations, the government through DOSH has opted for the constructive advising approach in assisting the SMEs. Focusing on elevating their OSH level of compliances, method other than dull enforcement is believed to lighten the burden on the SMEs. Besides, it is also believed that the friendly approaches by DOSH as the responsible government agency could motivate the SMEs to be more committed towards complying to OSH legislations and furthermore decrease the industrial accidents. Therefore, in 2016, DOSH has launched a new Strategic Plan for OSH in SMEs named “Strategic Plan of Occupational Safety and Health for Small and Medium Entrepreneurships 2016-2020”. The strategic plan introduced a program called “Compliance Support Door to Door- OSH Coordinator” where a personnel who would represent his/her company (SME), shall be appointed by DOSH and renowned as “OSH Coordinator” or OSHC (DOSH, 2016). Subsequently, the OSHCs shall be given several trainings conducted by DOSH. The training modules are specially developed by DOSH aiming to focus on the compliances of OSH Legislations within the SMEs. As previously found that training could reduce accidents and elevate OSH performance within manufacturing (Harpreet Singh, Didar Singh & Bobby, 2017b), DOSH proposes that the “OSH Coordinator” programme will succeed in improving OSH within Malaysia’s SME manufacturings

2. Methodology

This is an experimental intervention research with a pre and post measurements. According to Fraser and Galinsky (2010), an intervention research could be a systematic study

purportedly implemented to change strategies. It is also could become the practice-based evidence of any knowledge practiced.

2.1 Research Design

This research is a quantitative research, applying quasi-experimental design. In order to measure the effectiveness of the intervention, a measurement was imposed prior and post to the intervention. The research has also adapted the well-known training evaluation model renowned as Kirkpatrick Model (Kirkpatrick, 1998). The model is the best-known model for analysing and evaluating the results of training and programs that applies four levels of criteria. Level 1 : Reaction, measures how participants react to the training (e.g., satisfaction) and Level 2 : Learning; analyses the level of understanding among the trainees (e.g., increase in knowledge or skills). Level 3: Behaviour; determines whether the participants are utilizing what they have learned at work (e.g., behaviour change). Lastly, Level 4: Results, determines the positive impact of the training conducted towards the business / organization as the whole (e.g., increase in sales, decrease in expenditure or reduce accidents).

For the purpose of this research, the pre-intervention audit, which is in a form of workplace audit, was conducted before the commencement of the training sessions. The post-intervention audit would then be taking place five months after the last training session. This would allow the OSHC to utilize their knowledge acquired from the trainings to improve the OSH compliance at their respective workplaces. The post-intervention audit is aiming to measure the end result of the intervention program which is the improvement of OSH compliance at the organizational level.

Thus, the research framework is as per depicted in Figure 4.

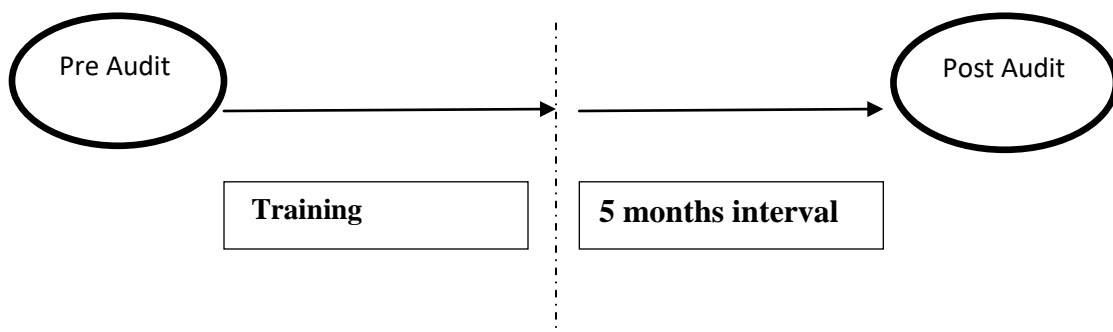


Figure 3: Research Framework

2.2 Research Instrumentation

At departmental level, DOSH has formed a special committee to develop a checklist which then be used as to conduct OSH audit. The checklist, then has become a formal used by the officers when conducting OSH compliance audit on the SMEs. The checklist is a summary of the minimum allocation required by the SME to comply with OSH related legislations (Nor Halim Hasan, 2006). Consist in the checklist is 6 elements, namely “safety and health management”, “physical safety”, “occupational health”, “welfare”, “materials production & storage” and “general safety”. Nor Halim Hasan also had conducted reliability test on the checklist items and the results of the Cronbach’s alpha indicated more than 0.7 for each item. Thus, it could be said that the checklist owns high stability, consistency and reliability (Sekaran & Bougie, 2013). The elements noted in the checklists are as per illustrated in Figure 5 below. The same checklist was applied in this research as the to measure the OSH compliance of the participating SMEs which also reflected the effectiveness of the intervention.

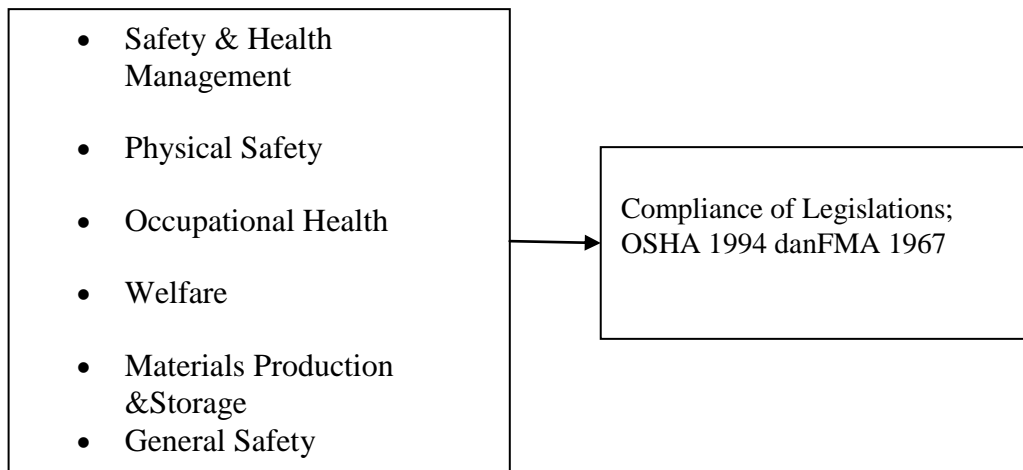


Figure 4: Elements in the Audit Checklist

2.2 Sampling Method

For the purpose of this research, 49 SMEs within Negeri Sembilan, Malaysia have been selected to enter “Compliance Support-OSH Coordinator” programmes. The selection criteria are including the inclusion and exclusion criteria are outlined as per Table 1.

Table 1: Sample Selection Criteria

Number of Company	Inclusion Criteria	Exclusion Criteria
49 companies	<ul style="list-style-type: none"> • Defined as SME • Manufacturing • Low compliance grade • Never were included in te previous compliance support programmes • Currently do not employ a competent Safety and Health Officer 	<ul style="list-style-type: none"> • Not defined as SME • Other sectors • Good compliance grade • Participated in any previous intervention programme by DOSH • Currently employing a competent Safety and Health Officer

In Malaysia, the definition of SME is outlined by the National SME Development Council or recently renowned as SMECORP Malaysia. The detail definition is detailed out in Table 2 below.

Table 2: SME Definition

Category	Small	Medium
Manufacturing	Sales turnover from RM 300,00 to less than RM 15 million <u>OR</u> full-time employees from 5 to less than 75	Sales turnover from RM 15 million to less than RM 50 million <u>OR</u> full-time employees from 75 to less than 200
Services & Other Sectors	Sales turnover from RM 300,00 to less than RM 3 million <u>OR</u> full-time employees from 5 to less than 30	Sales turnover from RM 3 million to less than RM 20 million <u>OR</u> full-time employees from 30 to less than 75

(Source :SME Annual Report 2012/2013, National SME Development Council)

2.3 Intervention Programme

DOSH Negeri Sembilan has conducted training towards the OSH Coordinators or “OSHC” who represent the selected 49 SMEs. The training consists 6 modules namely “occupational safety and health legislations”, “workplace safety and health committee”, “hazard identification-risk assessment-risk control”, “chemical safety management compliances” and “accident investigation reporting procedure”. The trainings were delivered by qualified and experienced DOSH officers who normally involve in performing compliance audits on various industrial sectors in Malaysia.

At the end of all training sessions, the OSHC should go back to their respective workplaces and implement the OSH compliance with close monitoring by DOSH.

2.4 Data Collecting Technique

For the purpose of this research, compliance auditing the specified checklist was performed by DOSH towards the participating SMES before the commencement of the OSHC intervention. The same compliance audit using then being conducted five months after the OSHCs finished training sessions. The data collection procedure is as per detailed out in Figure 6.

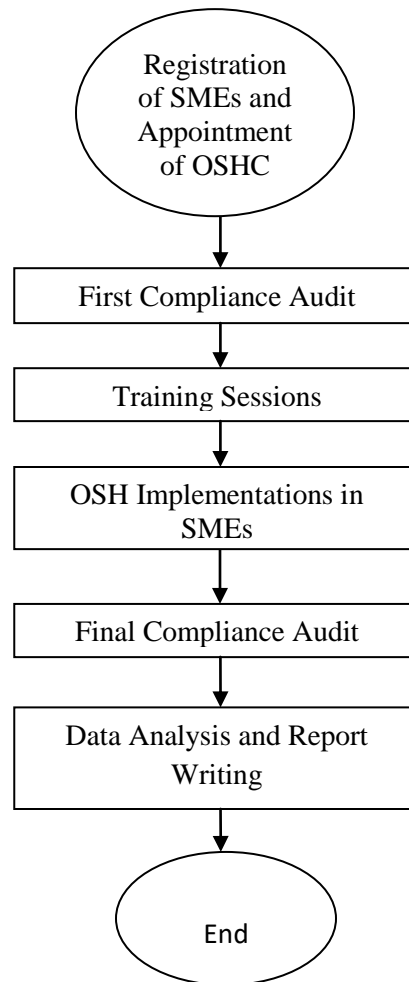


Figure 5: Training and Data Collecting Procedure

3. Results and Findings

This research conducted descriptive and inferential data analyses to determine the effectiveness of OSH-C intervention. The pre and post audit grades obtained by each respective SMEs have been analysed and presented in Table 3.

Table 3: Compliance Audit Results

Grade	No. of Companies(Pre)	No. of Companies (Post)
E	21	1
D	22	5
C	6	10
B	0	23
A	0	10

According to the above table, 21 SMEs obtained E grade, 22 obtained D grade, and 6 SMEs obtained C grade in the first compliance audit. None of the involved SMEs managed to attain the two highest grades during the pre-intervention audit. After five month intervals, the post-intervention's compliance audit was conducted and the results showed a tremendous achievement where 10 SMEs managed to get A and 23 SMEs obtained B grade. The remaining SMEs also had successful increased their level of compliance (C=10 and D=5). However, only 1 SME had no improvement in their OSH compliances. Bar chart in Figure 5 showed the comparisons of compliance audit grading achieved by the participating SMEs pre and post to the intervention.

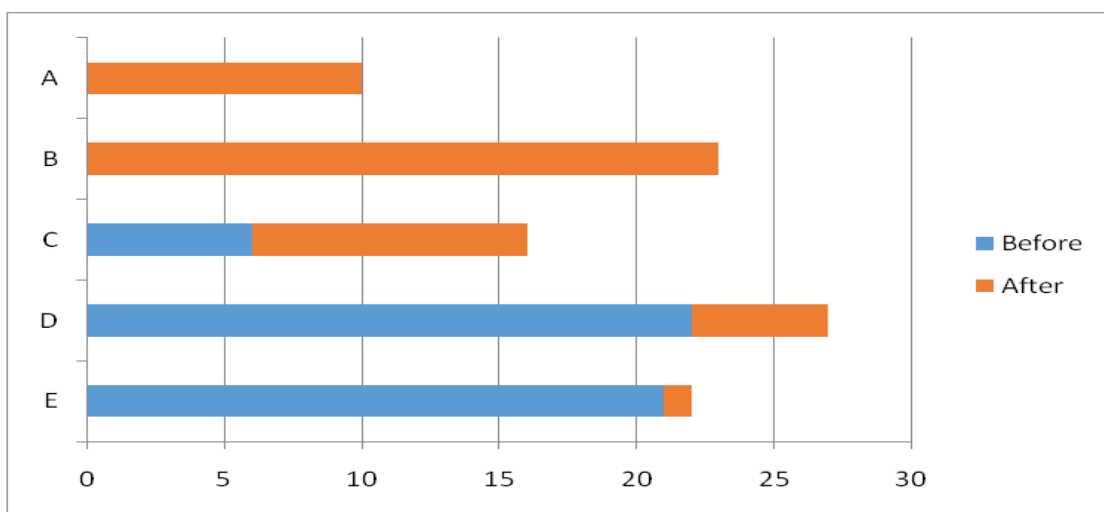


Figure 5: Comparisons of Audit Grades (Pre and Post)

Subsequently, Paired *t*-Test analysis was conducted to determine whether there is a significant difference in mean value between pre-intervention audit and post-intervention audit results. The *t*-Test revealed that there is a statistical difference of OSH compliance results ($P < 0.05$). It could also be seen that the mean of OSH compliance audit results increased from 42.45 (pre-intervention) to 73.16 (post-intervention).

Table 4: *t*-Test Results

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Post Interv. – Pre Interv.	30.56612	14.64789	2.09256	26.35876	34.77349	14.607	48	.000

4. Conclusion and Discussion

Based on the result's analyses, it could be concluded that the participating SMEs had increased their level of OSH compliance in five months after the intervention. This result proved that the OSHCs had put their acquired knowledge into practice within their respective organisations. The results also revealed that 67% of the SMEs obtained excellent and good compliance's grading (A & B). This is also the evidence to show that specific intervention provided by the government could help to improve the occupational safety and health's compliance level among the industries. This also matched with a finding by Lanoie (1992) who concluded that a specific intervention by the policy maker has proven to improve OSHA compliance in the US. Furthermore, the results of *t*-Test also showed that the difference between pre-audit results and post-audit results is statistically significant.

Furthermore, several previous researches have also determined the effectiveness of safety related training towards OSH performance. For example, Anil Kumar et.al. (2015) found that safety awareness in related to equipment handling among construction workers had significantly increased after a training intervention. In addition, Ghani and Mohd Baki (2008) also found that safety training is an effective way in minimising work related hazards in construction sites. Thus, this research could be the extension of such previous researches when it determines that specific

OSH trainings conducted by the government could increase occupational safety performance in terms of legal compliances.

As the main custodian on OSH in Malaysia, DOSH has previously conducted various training sessions to assist the industries in improving their safety performance. However, it is hardly to find empirical evidences on the effectiveness of the programmes. This intervention research provides a proven empirical evidence on the effectiveness of training conducted by DOSH. It also has fulfilled the two highest levels of Kirkpatrick's Training Evaluation Model (Level 3 & 4) which are the trainees apply the information and knowledge gained from the training into their workplaces; and the final result is the increments of OSH compliance audit gradings.

Several previous quasi-experimental research focusing on occupational safety had been conducted (i.e. Morteza Oostakhan, Amir Abbas Mofidi & Amirhosain Davudian Talab, 2012; Mansur & Nasution, 2016; Choudhry, 2014) but most of them focusing on safety compliance behaviour among workers. Whilst this research in an intervention which its outcomes is to measure the OSH compliance performance of an organisation as the whole due to the intervention conducted by the responsible government agency.

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