Original Article

# Evaluation of Effectiveness of OSH Regulatory Competency Training in NIOSH Malaysia

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**ABSTRACT :** *Training is an integral part of Occupational of Safety and Health (OSH). It is appropriate for organizations to enhance their productivity and profitability by providing mandatory training to maximize employee potential. This study is intended to analyse the effectiveness of OSH regulatory competency training program conducted by National Institute of Occupational Safety and Health (NIOSH) and its contribution to develop a competent person in industries. This study looks into the training data of nine regulatory competency programs conducted in NIOSH from 2015 to 2019. Objective of this study is to determine the effectiveness of NIOSH regulatory competency programs in the development of competent person in Malaysia and to priorities identified factors that contributes to the effectiveness of NIOSH regulatory competency program. The Kirckpatrick's Model was used to evaluate the effectiveness of training. It was analyzed at four levels, i.e. (i) Trainees reaction towards training, (ii) learning of training content, (iii) Changes in job behavior after attending training and (iv) Outcome / Utility on selected dimensions. Result shows that respondents strongly agree with the Measurement of Learning on Training Contents with the highest mean of 4.27 and standard deviation of 0.697. While respondents agree with Participants' Perception which recorded the lowest mean of 4.17 and standard deviation of 0.738. This indicated that competent person appreciated the competency which has been obtained as it has influenced them in their work performances mainly on the characteristics, job commitment and work effectiveness. This study confirmed that the increase of competent person contributes to one of the factor reduction of the accident rate at the workplace.*

**Keywords :** *Accident, Competent Person, Competency Program, Effectiveness, Occupational Safety and Health (OSH), Training*



## 1.0 INTRODUCTION

Training plays a crucial role in Occupational Safety and Health (OSH) programs. It is an integral part of creating a safe and healthy work environment and ensuring the well-being of employees to ensure the success of any OSH program at the workplace, adequate and effective training must be implemented for all those responsible in OSH. According to Department of Occupational Safety and Health (DOSH), a competent person (OYK) in OSH is a person appointed by the employer and authority to have appropriate training, knowledge, experience and skill to carry out specific task, to identify hazard and minimise risk at workplace. The study comprises the training effectiveness data of nine regulatory competency programs conducted in National Institute of Occupational Safety and Health (NIOSH) Malaysia from 2015 to 2019 namely; Safety and Health Officer (SHO), Site Safety Supervisor (SSS), Authorised Gas Tester and Entry Supervisor for Confined Space (AGTES), Occupational Health Doctor (OHD), Chemical Hazard Risk Assessment (CHRA), Indoor Air Quality (IAQ), Hygiene Technician 1 (Chemical Monitoring) (HT1), Hygiene Technician 2 (Inspection, Testing and Examination of Engineering Control Equipment) (HT2) and Noise Risk Assessor (NRA). The most well-known and used model for measuring the effectiveness of training programs was developed by Donald Kirkpatrick named Kirkpatrick Model (table 1) by measuring factors such as lowered spending, higher returns on investments, improved quality of products, less accidents in the workplace, more efficient production times and a higher quantity of sales. The Kirkpatrick Model's comprehensive, structured approach and its focus on practical outcomes and continuous improvement make it a standout choice for evaluating training programs compared to other models.

**Table 1 Kirkpatrick Four Level Model**

| Kirkpatrick's Four Level of Evaluation | Area of Measurement |
|---|---|
| Level 1 – Reactions | Measures how participants have reacted to the training |
| Level 2 – Learning | Measures what participants have learned from the training |
| Level 3 – Behaviour | Measures whether what was learned is being applied on the job |
| Level 4 – Results | Measures whether the application of training is achieving result |

According to (Khanikar, 2018) evaluation of training refers to its effectiveness, relevance and its impact in achieving predetermined objectives of the training programs. The basic purpose of evaluation of training program is to find out the degree of achieving desired benefits and goals along with the causes of failure, if any (Khanikar, 2018).

Providing training is a way of showing how the company is committed to its employees, which in turn they feel appreciated, challenged and feel more satisfied toward their jobs. It is but proper for organizations to improve their productivity and profitability by providing mandatory training to maximise employee potential. These training activities will lead to the increased competitive advantage of employees. However, when providing training programs, it is also necessary if the activities will match the needs of teams and individual employees. In addition, after the training, practical benefits may be observed in the workplace, for example, trainees may be able to transfer their knowledge and skills to other employees (El Hajjar, 2018).

As an OSH practitioner, an OYK has an important role in ensuring the compliance of OSH in an organization by leading the main role in delivering the improvements required. OYK must have the ability to assess the situation which may arise in an organization, formulate solutions, effectively communicate at any level and generally promote the goals and purpose

of safety and health at the workplace (Shahronizam et al 2017). By conducting training effectiveness studies, organizations can ensure their training programs are impactful, aligned with business goals, and contribute to overall success.

According to ISO 45001:2018 clause 7.2, the organisation must determine the competence requirements for those workers that affect, or could affect, its occupational health and safety performance. This requirement also pertains to workers operating under the control of the organisation such as contractors, agency workers and others. Once these competence requirements have been determined, the organisation must then ensure that those workers possess the necessary competence, including the ability to identify hazards, on the basis of appropriate education, training or experience (International Organization for Standardization, 2018 )

This study was conducted as one of the feedbacks to NIOSH regulatory competency training program. Furthermore, the study will also resolve OSH issues that need to be solved. The problem statements for this research include the effectiveness of OSH program being conducted in line with scope or prospect in knowledge by practice or practitioner, a competency program attended can reduce or enhance the knowledge or practices or attitude of the personnel and OYK contribution to accident statistics involving industries in Malaysia.

## 2.0 METHOD

The respondent of this study are those whom matched three criteria namely; have attended NIOSH training program, passed the examination and have successfully registered as a OYK with the DOSH. Sampling method for this study is by simple random sampling. This research will look into nine OSH regulatory programs conducted in NIOSH from 2015 to 2019. The population of this study are divided into two groups which are OYK and employers

### 2.1 Population and Sample

The population of this study was calculated from the number of participant whom have attended nine OSH regulatory programs conducted in NIOSH from 2015 to 2019 and passed the related examination and consequently registered as OYK with DOSH is 7,754. The sample size used in this study was 200 respondents. The calculation was done using Roasoft software with a confidence level of 95%. While the population size for employer is 77, therefore the sample size is 59. Table 2 shows the three criteria of respondents according to the nine OSH regulatory training programs.

**Table 2 Respondents Criteria According to Nine OSH Regulatory Programs**

| No. | OSH Regulatory Competency Training Program | NIOSH training participant | Candidate passed NIOSH exam | Registered as Competent Person |
|---|---|---|---|---|
| 1. | Safety and Health Officer (SHO) | 10,337 | 2,463 | 247 |
| 2. | Site Safety Supervisor (SSS) | 5,831 | 1,566 | 272 |
| 3. | Authorised Gas Tester and Entry Supervisor for Confined Space (AGTES) | 28,720 | 12,031 | 6,544 |
| 4. | Occupational Health Doctor (OHD) | 1,149 | 593 | 487 |
| 5. | Chemical Hazard Risk Assessment (CHRA) | 148 | 59 | 59 |

| | | | | |
|---|---|---|---|---|
| 6. | Indoor Air Quality (IAQ) | 316 | 12 | 12 |
| 7. | Hygiene Technician 1 (HT1) | 263 | 54 | 32 |
| 8. | Hygiene Technician 2 (HT2) | 336 | 28 | 22 |
| 9. | Noise Risk Assessment (NRA) | 347 | 107 | 79 |
| | TOTAL | 47,447 | 16,913 | 7,754 |

Based on table 2, the total of matched data from NIOSH training participant, passed the related examination and registered as OYK from year 2015 to 2019 is 7,754. The highest number of registered OYK trained in NIOSH AGTES with 6,544 persons, followed by OHD with 487 and SSS with 272. This is parallel with the record of highest intake of regulatory competency training program from year 2015 to 2019 in NIOSH is AGTES with a total of 28,720 participants, followed by SHO with 10,337 participants, and SSS with 1,566 participants.

### 2.2 Data Collection

In this study, questionnaires were used as the data collection instrument. Data collection is through email to the OYK and employer all over Malaysia. Development of questionnaires were done by using Question Pro. The questionnaire which was designed for OYK has 5 sections, which comprises Section A – Respondent Profile, Section B – Company Profile, Section C – General Evaluation, Section D – Participants' Perception and Section E – Evaluation of Effectiveness.

Where else questionnaire for employers has 6 sections which comprises Section A – Respondent Profile, Section B – Company Profile, Section C – Management Commitment, Section D – OSH Communication, Section E – OSH Compliance and Section F – Behaviour. For section E, the questionnaire was separated into four levels according to Kirkpatrik Model. The details as below: Level 1: Reaction of trainees towards training, Level 2: Measurement of learning on training contents, Level 3: Measurement of 'Changes in job behaviour' and Level 4: Outcome /Utility of training

Table captions appear centered above the table in upper and lower case letters. When referring to a table in the text, no abbreviation is used and "Table" is capitalized. (9). Symbols and abbreviations are defined immediately below the table.

## 3.0 RESULT AND DISCUSSION

The pilot study was done before distributing the questionnaire to the actual respondents. Reliability refers to consistency, accuracy and predictability of the scale used in the study. Based on table 3 the value of Cronbach's alpha ranges from 0.892 to 0.960 and it shows that there is good reliability between various items of a multiple item scale.

**Table 3 Reliability Analysis of Variables For Competent Person**

| Independent Variables | No of Items | Cronbach's alpha |
|---|---|---|
| General Evaluation | 8 | 0.892 |
| Participants' Perception | 7 | 0.953 |
| Level 1 – Reaction of Trainees Towards Training | 9 | 0.938 |
| Level 2 – Measurement of Learning on Training Contents | 5 | 0.952 |
| Level 3 – Measurement of 'Changes in Job Behaviour' | 6 | 0.960 |
| Level 4 – Outcome / Utility of Training | 5 | 0.930 |

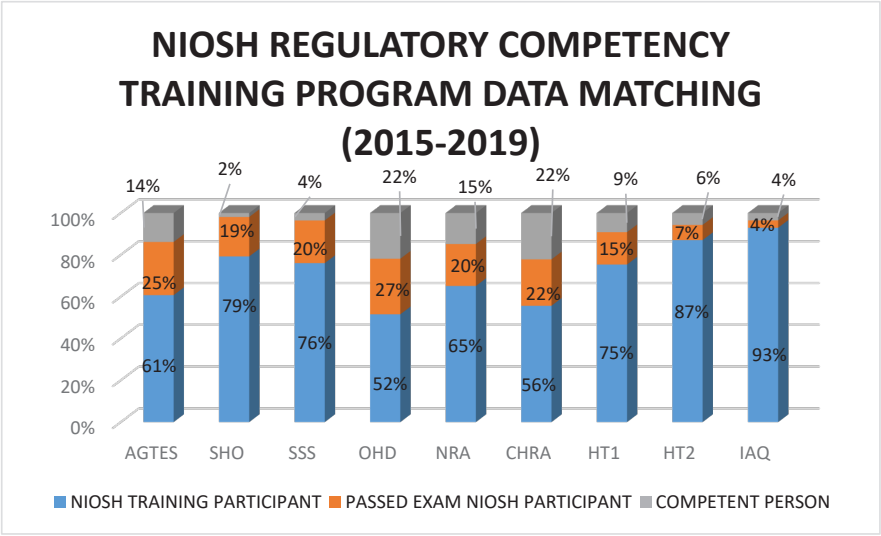


**Figure 1: NIOSH Regulatory Training Program Data Matching from 2015 to 2019**

Figure 1 shows the comparison of percentage in data matching of NIOSH training participant, participant whom have passed NIOSH exam and NIOSH training participant registered as OYK with DOSH. Based on the data, the highest training participant registered as OYK is OHD, and CHRA with both equally 22%, followed by NRA with 15% and AGTES with 14%. The highest percentage of participant passed NIOSH exam is from OHD with 27%, AGTES with 25% and CHRA with 22%. The least NIOSH training participant registered as OYK is SHO with only 2%, SSS and IAQ with both equally 4%.

Based on table 4, in terms of evaluation of training effectiveness, OYK strongly agree with the Measurement of Learning on Training Contents with the highest mean of 4.27 and standard deviation of 0.697. While OYK agree with Participants' Perception which recorded the lowest mean of 4.17 and standard deviation of 0.738. This indicated that OYK appreciated the competency which has been obtained as it has influenced them in their work performances mainly on the characteristics, job commitment and work effectiveness.

**Table 4 Level Kirkpatrick Model to Measure Effectiveness of Training**

| Independent Variables | No of Items | Mean | Std. Deviation |
|---|---|---|---|
| General Evaluation | 8 | 4.22 | 0.671 |
| Participants' Perception | 7 | 4.17 | 0.738 |
| Level 1 – Reaction of Trainees Towards Training | 9 | 4.22 | 0.744 |
| Level 2 – Measurement of Learning on Training Contents | 5 | 4.27 | 0.697 |
| Level 3 – Measurement of 'Changes in Job Behaviour' | 6 | 4.24 | 0.695 |
| Level 4 – Outcome / Utility of Training | 5 | 4.21 | 0.718 |

Based on figure 2, employers' perception on OSH were divided into four sections, which are OSH Commitment, Effective Communication, OSH Compliance and Behaviour. It was found that 52% of employers strongly agreed that they have practiced OSH compliance at their workplace. While, 48% of employers strongly agreed that management needs to be committed to OSH, followed by 47% of employers strongly agreed management needs to have effective communication in practising OSH in the workplace. It was also found that only 34% of employers strongly agreed having the right attitude to be taken into consideration when implementing OSH in the workplace.

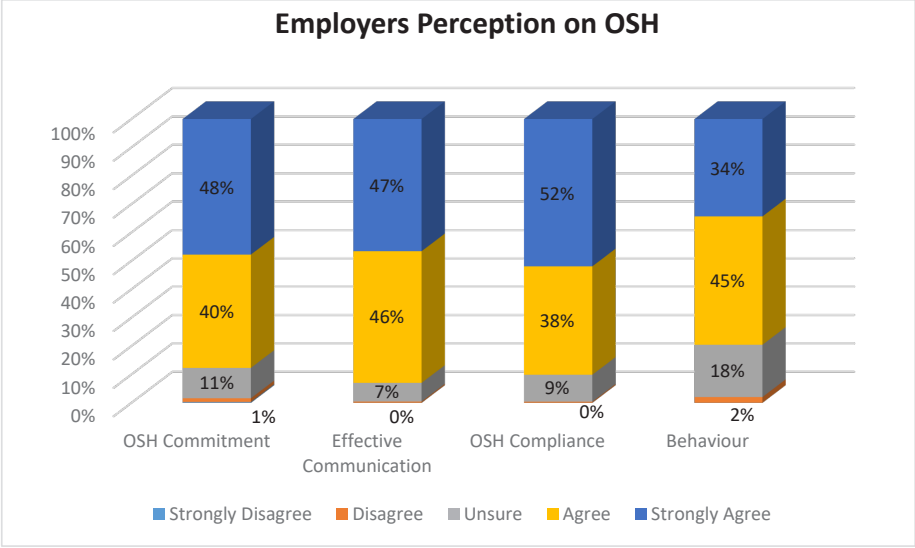


**Figure 2: Employers Perception on OSH**

Based on DOSH Statistics on Occupational Accident and Diseases (2019), it is indicated that there is a reduction of accident rate from the year 2015 to 2019. Whereas, based on the results from Figure 1 on Data Matching of NIOSH Regulatory Competency Training Program, the rate of registered OYK was calculated and showed that there is an increase of 3.07 in 2019 as shown in figure 3. The establishment of an effective organizational structure includes operational procedures and practices, effective education and training programmers, appropriate levels of well-trained staff and allocation of necessary resources contribute to the reduction of hazards and risks (K. Makka, 2018). This data concludes that the increase of OYK contributes to one of the factor reduction of the accident rate at the workplace.

NIOSH as one of the registered training provider with DOSH have also shown to contribute to the reduction of the accident rate at the workplace through training and competency development which allows OYK to perform effectively in managing OSH in industries by demonstrating the competence level and contributing to reduction of accident rate.

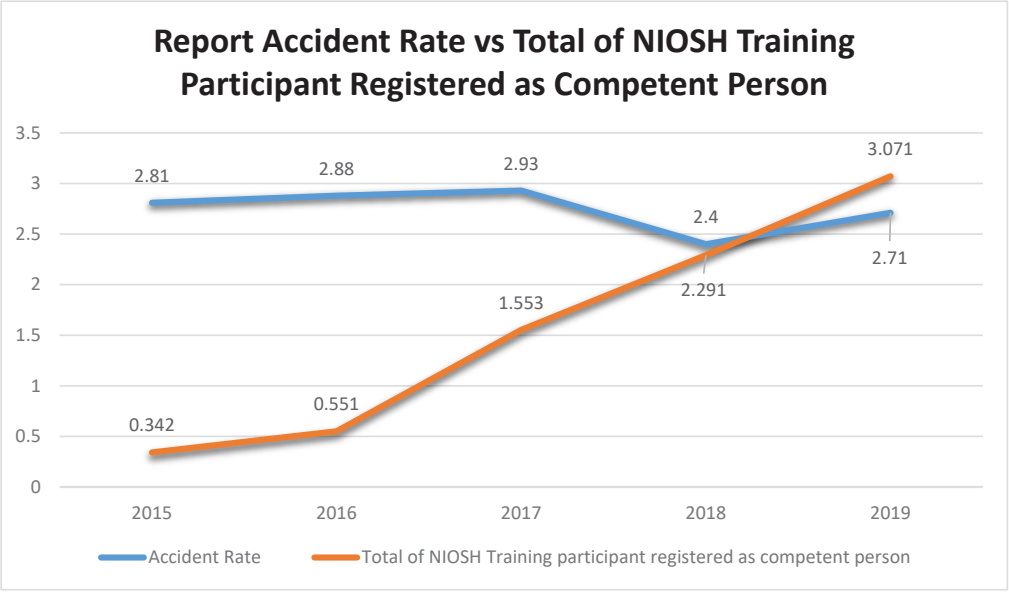


**Figure 3: Comparison between Accident Rate and Total of NIOSH Training Participant Registered as Competent Person**

## 6.0 CONCLUSION

Based on this study, it is recommended that more awareness and information shall be disseminated to encourage more workers to attend competency based training program to enable them to become an effective OYK. OYK plays an important role in minimizing accident and fatality at workplace by demonstrating knowledge and skills, information dissemination and adhering to company OSH requirements. NIOSH and DOSH respectively has played their part in ensuring knowledgeable and skilful OYK are developed to cater for the national and industrial needs. Thus, OSH OYK is recognized as a leading factor in venturing into new career development and to sustain the quality of OSH involvement in the industry.

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