

# Development and Validation of Instruments for Measuring Principal Employer's Roles and Responsibilities in Occupational Safety and Health (OSH) Implementation in Malaysia

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**ABSTRACT:** Roles of principal employer is very important in enhancing and empowering Occupational Safety and Health (OSH) implementation. This study have identified four elements (i.e., high commitment, effective communication, full compliance and good behavior) as among the crucial elements required to be possessed by the principal employers in three sectors, namely manufacturing, public services and construction. In relation to this, this paper describe the development and validation of instruments prior to the measurement of principal employers' roles and responsibilities in the implementation of OSH. Three assessment tools were developed, namely the Benchmarking Interview, Questionnaire and Workplace Inspection. Fifteen companies were selected for the benchmarking interview, 50 employers conveniently selected for the survey interview (covering three sectors) and 90 employers selected for the workplace inspection (30 respondents for each sector). The development of benchmarking interview and workplace inspection scores are briefly discussed while the main focus is on the validation of the survey constructs (or items). The reliability check on 53 items representing four elements (i.e., Commitment, Communication, Compliance, Behaviour) of employers' roles and responsibilities in the implementation of OSH showed that the Cronbach's Alpha coefficient is more than 0.90 which indicates that the internal consistency is extremely reliable. It also indicates that the set of items in each element are closely related and well understood by the respondents. Validity check on the items based on the Rasch measurement infit and outfit mean square statistics and standardized z-score found that nine items had misfitting values and finally corrected for further analysis. This study had shown that a valid and reliable instruments are important in ensuring that accurate and precise findings are obtained in measuring the roles and responsibilities of principal employer in the implementation of OSH.

**Keywords:** Behaviour, Commitment, Communication, Compliance, Employer, Occupational Safety and Health

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## 1.0 INTRODUCTION

This paper will focus on the development of the instruments used in this study and the validation process of the instruments. In order to ensure the quality of instrument to measure the element of leadership from employers in Occupational Safety and Health (OSH) aspect, validation test has to be done.

Under the Social Security Act 1969, the definition of a principal employer is the person who employ workers directly to work with them. Whereas the direct employer means a person who conducting a work by him or through a primary employer. Whereas, under the Occupational Safety and Health Act (OSHA) 1994, the principal employer means an industry or person with which an employee has contracted a service such as a manager, agent, or person in charge of

payment of wages to a worker, occupier of a workplace, legal representative of the owner, any government department, local authority or statutory body. Meanwhile, direct employers mean employees who are employed by or through them. Principal employer means the owner of a workplace and who hire workers to work for them. In many cases, principal employer is grouped as the company top management team.

The roles of employer in Occupational Safety and Health (OSH) are stated clearly in Section 15, Occupational Safety and Health Act 1994 (OSHA 1994). An employer is responsible to ensure safety, health and welfare of every person at the place of work. This includes providing OSH instructions, OSH training, communicate hazards and practical hazards control measure. Clearly, an employer plays important role in implementing and sustaining OSH requirements. In reality, spoken with ethical conduct is simple rather than truly ethical treatment. There are challenges in delivering the call for responsibility in OSH as the employer has a big role attending other parts of organization needs. However, continuous improvement in OSH is vital towards empowerment of employers' responsibility. Leading by example is the key of being a good employer in order to gain trust from his employees and contractors as well as portraying positive leadership approach.

According to Wu, Tsung Chih (2010), involvement by employer or top management has a huge impact on OSH. Employer has three responsibilities, namely (a) ensuring the performance of OSH among middle management teams, (b) ensuring quality of OSH management, and (c) participate in each OSH activity. The concept of Wu, Tsung Chih (2010) in the OSH leadership by employers highlighted the three main elements which are Safety Caring, Safety Coaching and Safety Controlling. This is reinforced in the Reason (1997) study, which states that the individual's status is higher in an organization where all its actions have a greater impact. In detail, senior management should approve and disseminate the OSH policies, regularly review the OSH performance and create reasonable incentives for middle management involve in the implementation of OSH (Petersen, 1998).

In this study, the main element in OSH leadership of employers is measured based on their practice at the place of work. Apart from that, others issues such as factors hindering the employer to deliver their roles and responsibilities in OSH as well as most common hazards and control measures at the place of work are also being analyzed. Therefore, the right instrument used gives reliable and adequate findings. There are three instrument used in this study:

- i. Benchmarking interview questionnaire
- ii. Questionnaire form
- iii. Workplace inspection checklist

Benchmarking interview questionnaire used to get the initial opinion regarding the issues related to study such as types of hazards and preferred control measures, common obstacles in delivering roles and responsibilities in OSH. The findings from interview session are use in developing the questionnaire for this study. Pilot test on the developed questionnaire were conducted before executing data collection. Along with data collection, workplace inspection were conducted using workplace inspection form to verify the OSH practice at place of work.

## **2.0 LITERATURE REVIEW**

Management commitment, communication, compliance and behavior are among important elements to be studied related to the roles and responsibilities of principle employer. Commitment is referred to actions or responsibilities that the management should shoulder on regarding to the employees' OSH issues. It is particularly important to the employer in managing employees and to reduce the number of accidents at the workplace. Mohamed Taufek et. al (2016) states that the element of commitment has a strong relationship with the factors of workplace accidents.

Salleh, Hamid, Zakaria & Mutalib (2015) found that medium of communication is very important in providing useful information to employees. Use of appropriate, attractive and easily understood communications are recommended especially for foreign workers so that they can understand the overall aspects of OSH in the construction industry in Malaysia. The Malay language is commonly used as the intermediate language in Malaysia during information delivery and OSH Induction Course either in oral or written form. However, the use of Malay language is not understood by most of the foreign workers. The OSH information should be understood by foreign workers so that they aware the dangers at the construction sites. Effective communication is important since Kamar et al. (2014) had shown that 55.9% of respondents said that effective communication is very important to be practiced in any organizations.

Compliance with safety requirements enable work to be done both efficiently and safely. One very promising line of enquiry concerning the behavioral antecedents of accidents concerns the relationship among these procedural instructions governing work and the way in which work is done (Che Hassan et al., 2007). Previous study also found that any support or assistance received by Small and Medium Enterprises (SME) in implementing OSH will be able to encourage the industries (Lingard & Rowlinson, 2005). In the operation analysis report by Abdul Rahman (2007), 80% of the workplaces did not

comply fully to the OSH regulations. Therefore, compliance issue should be intensively studied in order to identify the barriers in OSH implementation at place of work.

Several previous researches found the predictors towards developing safe working behavior at the workplaces. The predictors are namely management commitment, management safety practices, company's safety policy and procedures (Chinda, 2011; Vinod Kumar & Bhasi, 2010; Lu and Tsai 2008). Previous studies furthermore concluded that accident in workplaces could be reduced if the employees and employer were committed in having and maintaining good safety behavior (Makin & Suntherland, 1994; Christian et.al., 2009). Therefore, safety behavior must be seriously addressed and promptly monitored at the workplaces to prevent industrial accident cases.

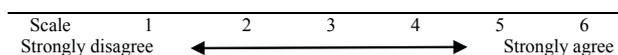
### 3.0 METHOD

This section describes the development and validation of instruments for measuring the principal employer roles and responsibilities in OSH implementation in Malaysia. The instruments include Benchmarking Interview Form, Survey Questionnaire and Workplace Inspections checklist. For the Benchmarking Interview, an open-ended interview session was conducted to fifteen organizations that have been identified as recipients of the National Council of Occupational Safety and Health (NCOSH) CEO Excellence Award for the year 2010-2015. The intention is to obtain a benchmark for best practice in Occupational Safety and Health. The other reason is to gain insights and understanding regarding their opinion in measuring the employer's roles and responsibilities in OSH implementation in Malaysia. The benchmarking interview session was conducted face-to-face using a set of open-ended interview questions. For the survey questionnaire, it was developed based on an extensive discussions of subject matter with the industrial experts. The questionnaire had gone through several validation processes which include content, face and construct validation from the industrial and statistics experts. Comments and suggestions were obtained from the industrial experts on the OSH legislative contents and structure of the questionnaire.

**Table 1: Questionnaire for Development of OSH Improvement Plan to Empower the Role of Principle Employers on OSH Implementation in Malaysia**

Part	Elements	Questions / Statements (Items)	Reliability Index
A	Respondent Profile	11 Questions	nil
B	Company Profile	6 Questions	nil
C	Hazard At Workplace	5 items	nil
D	Control Of Hazard	6 items	nil
E	Factors That Prevents The Principal Employer In OSH Implementation	8 items	nil
F	Management Commitment	18 items	0.953
G	OSH Communication	9 items	0.935
H	OSH Compliance	18 items	0.964
I	Behaviour	8 items	0.938
J	Others: Accident Data & Respondent Opinion On Method/ Product	4 items	nil

For Part F, G, H and I, a 6-point numerical scales are used to measure the items in Fig. 1:



**Figure 1: Numerical Scales**

For measuring the construct reliability of the questionnaire, a pilot study was conducted on 50 employers from the target sectors of industry. The purpose is to assess the reliability of the measured items using Cronbach's Alpha ( $\alpha$ ), which is a measure of internal consistency. Table 1 shows four elements which have been identified as important in measuring the employer's roles and responsibilities in OSH implementation in Malaysia. These elements are Management Commitment,

OSH Communication, OSH Compliance and Behavior. Each element is represented by a number of relevant items (or constructs) which have been subjected to a reliability check. The Cronbach’s Alpha values for the four elements in Part F, G, H and I are shown in Table 1. The Cronbach’s Alpha for all four elements are well above 0.90 which indicate that the set of items in each element are closely related and well understood by the respondents.

The selection of scales correspond to the respondent’s true opinion relating to the statements. This study used Stratified Random Sampling in order to select the sample unit (i.e., employers). According to Vries (1986), this type of sampling technique is suitable since the population can be divided into heterogenous strata with sample size calculated proportionately according to the size of the sub-population (Lohr, 2010). This sampling technique is applicable in this study since the population can be divided into three sectors namely, manufacturing, construction and public services where each sector of industry or strata is further divided into sub-strata or sub-sector. Based on the calculation of sample size, the validated questionnaires were distributed to 380 employers across the three sectors. The criteria for the sampling element is a respondent at the managerial level or at par with the principle employer’s position.

Validation of the items in Part F, Part G, Part H and Part I were further investigated using the infit/outfit mean square (MNSQ) statistics which was obtained based on the Rasch rating model in Equation 1.

$$P_{nik} \left( X/B_n, D_i, F_k \right) = \frac{e^{(B-[D_i+F_k])}}{1 + e^{(B-[D_i+F_k])}} \quad (\text{Eq. 1})$$

Where  $P_{nik}$  is the probability of person  $n$  choosing “disagree” (Category 1) over “strongly agree” (Category 0) on any item ( $i$ ). In this equation,  $F_l$  is the difficulty of the threshold, and this difficulty calibration is estimated only once for this threshold across the entire set of items in the rating scale. The threshold difficulty  $F_l$  is added to the item difficulty  $D_i$  (i.e.,  $D_i + F_l$ ) to indicate the difficulty of Threshold  $l$  on item  $i$ . Given that  $B_n - (D_i + F_l)$  has the same value as  $B_n - D_i - F_l$  and helps to show more easily the shared bases of the Rasch models. Thus the general form of the rating scale model expresses the probability of any person choosing any given category on any item as a function of the agreeability of the Person  $n$  ( $B_n$ ) Wright, B.D., & Masters, G.N. (1982). Rating scale analysis. Chicago: MESA Press.

Out of 53 items which was validated for misfit or inappropriate response, there are 9 items as shown in Table 2 which have been identified as misfit since these items does not fall within the acceptable range of the Rasch expected model, at standardized t-scale between -2.0 and +2.0 and/or infit/outfit range between 0.6 and 1.4 logit (Bond and Fox, 2011). These items are also validated in the Wright map as shown in Fig. 2.

**Table 2: Item Statistics Misfit Order for 53 items**

Items	Measure	Infit MNSQ	Infit ZSTD	Outfit MNSQ	Outside ZSTD
F16	.98	1.37	4.9	1.68	7.8
F17	-.06	1.50	5.7	1.64	6.8
F14	.15	1.43	5.1	1.56	6.2
H3	.34	1.39	4.8	1.46	5.3
F7	.36	1.29	3.6	1.44	5.1
I2	.76	1.24	3.2	1.44	5.2
F1	-1.13	1.32	3.9	1.44	2.3
F4	.34	1.28	3.5	1.23	3.3
F2	.07	1.20	2.5	1.27	2.7

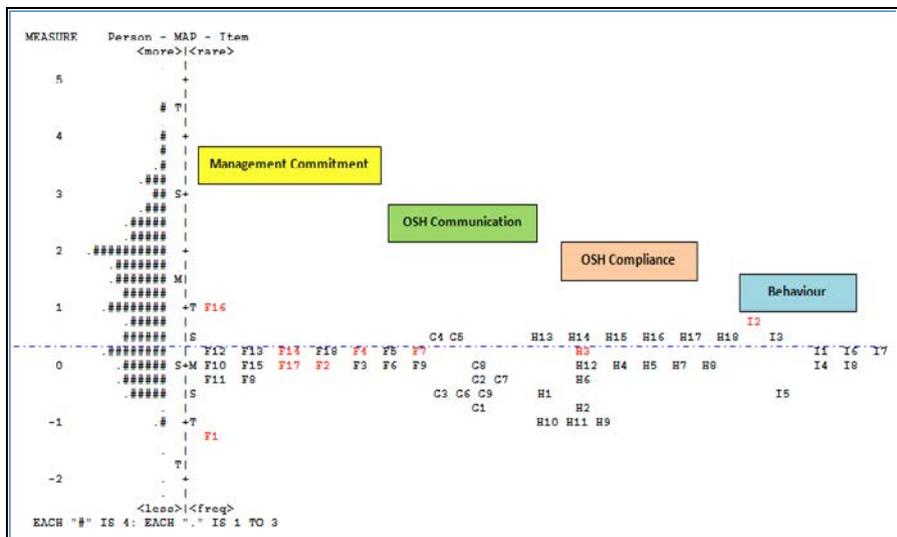


Figure 2: Wright Map of Statistics Misfit Order

The next instrument used which is the Workplace Inspection List was used to verify the company’s OSH status based on on-site inspections conducted by OSH officers at selected workplaces. A total of 90 workplaces covering all related sub-sectors were inspected. The methods of inspection consist of workplace observation and OSH documentation review. The workplace inspection checklist has been validated by several experts and used by the National Institute of Occupational Safety and Health (NIOSH) Malaysia for standard workplace inspection. The workplace inspection checklist content is shown in Table 3. Marks obtained from the company inspection check list for Part 2 and 3 are categorized under the Compliance Level as “not satisfactory, satisfactory, good and excellent”. The data collected was analyzed using the IBM SPSS Statistics 21 (IBM Corp., Armonk, N. Y., USA, 2017).

Table 3: Workplace Inspection Checklist & Score

Part	Elemen	Statement
1	Company Profile	11
2	OSH Documentation Review	21 (including 5 sub-elements)
3	Workplace Physical Inspection	12 (including 66 sub-statements)
<b>Marks Percentage (%)</b>		<b>Compliance Level</b>
75 to 100		Excellent
50 to 74		Good
25 to 49		Satisfactory
0 to 24		Not satisfactory

#### 4.0 RESULTS AND DISCUSSION

Results from the pilot study showed that Cronbach’s Alpha coefficient ( $\alpha$ ) for all items/ statements in Sections D, F, G, H and I is 0.98 which indicate the an extremely high reliability on the items. The individual Cronbach’s Alpha coefficients ( $\alpha$ ) for sections D, F, G, H and I are 0.83, 0.91, 0.91, 0.91 and 0.97, respectively which is generally above 0.9. DeVellis (2003) claims that Cronbach’s alpha coefficient greater than 0.7 is reasonably reliable. When the value approaches 1, it indicates that the internal consistency is extremely reliable.

However, there are several research limitations are expected from this study. Researchers are likely to encounter difficulties in getting full cooperation from the principal employers, in obtaining information such as details of workers and number of accidents or occupational disease as it is classified as confidential. Other than that, researchers encounter problems in getting the accurate information of company such as their contact address, type of business and number of workers. This is due to the company’s failure to update their records on time or misunderstood in supplying required

information to DOSH and SOCSO. Workplace inspection might also requires verbal permission from the respective companies before it can be conducted. There might be a situation where not many work activities running while inspection is conducted making the Furthermore, few construction project were located far from office making the logistic arrangement were quite difficult and time consuming.

Respondent shares their commitment, communication, compliance and behavior in delivering their roles and responsibilities in OSH implementation. Furthermore, other information such as types of hazard and the control measure taken can be complied in a priority list to see the trend of most practical control. Other than that, limitation factors on delivering the roles and responsibilities of employers can be obtained from the complete questionnaire. All off these data can be considered as accurate due to strong validity and high reliability of the instrument used. It can be concluded that all the items/statements are reliable, consistent, has minimal error and statements are well understood by respondents.

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