

Safety Behavior Factors of Provisioning Technician in Telecommunication Company

Atya Nur Aisha

¹Industrial Engineering Department
Telkom University
Bandung, Indonesia

²Doctorate Program of Industrial Engineering and Management
Institut Teknologi Bandung
Bandung, Indonesia
atyanuraisha@gmail.com

Fida Nirmala Nugraha, Indi Erdiniaty

Industrial Engineering Department
Telkom University
Bandung, Indonesia
fida1619@gmail.com, indierdiniaty@gmail.com

Abstract

Some jobs in the telecommunications sector are having high risk level of accidents, including the job of those provisioning technicians. In telecommunication companies which were the object of research, the rate of work accidents due to falls from a height and contact with sharp objects has increased in two years periode (2016-2018). Therefore, it is important to pay attention to the behavioral aspects of workers to minimize the risk of work accidents. This study aimed to identify the safety behavior factors that are relevant to the job of a provisioning technician. Questionnaires were distributed to 179 provisioning technician workers in one company in Bandung area. The number of questionnaires returned was 64 (response rate 35,75%). Data processing was carried out using exploratory factor analysis to determine the safety behavior factors. The results showed that there were 12 indicators that grouped into three factors of work safety behavior namely: safety concern, safety compliance, and safety participation. These safety behavior factors can be used to develop recommendations for safety behavior improvement program for provisioning technicians.

Keywords

Safety behavior, provisioning technician, factor analysis

1. Introduction

Occupational safety and health administration (OSHA) in Indonesia is often neglected. According to Social Security Agency of Employment, the number of work accidents showed an increasing trend in 2017 to 2018. The number of work accident reported in 2017 was 123,041 cases, meanwhile throughout 2018 it reached 173,105 cases (Social Security Agency of Employment, 2019). The rate of fatal accidents in developing countries is four times higher than in industrialized countries. Low literacy and poor training regarding safety methods are the cause of the high rate of work accidents in developing countries (Markkanen, 2004). In addition, another cause of work accident in Indonesia is due to the low awareness of the importance of implementing occupational safety and health (OSH) among industry and society. Most workers only know about occupational health and safety problems after starting work, even though they should have that understanding when they enter work (Social Security Agency of Employment, 2016).

In the telecommunications sector where majority of technicians that work on mobile stations and towers in the country, high risk of work accidents such as deaths from falls whilst working at heights or electrical shocks from

radio mobile equipment's due to the non-use of safety equipment's for personal protection or non-standard gloves for electrical works. Those were most often found than accidents cause due to overconfidence and carelessness by technicians in such accidents and hazards on telecommunication mobile sites that led to either death or injuries, that in fact could have been avoided (Olawale and Aigbavbova, 2019). In Dewi, Agung and Sudarsana (2013) research, several work accidents at telecommunication companies that still occur include the following: falling from a height, being exposed to electric shocks, scratching work tools and overheating for outside service employees. The Kim and Jeong's (2015) research showed that workers in the telecommunications sector with outdoor work locations, have a higher risk of work accidents than indoor workers. In addition, there were also significant differences in body posture when working and on operational processes in carrying out work between outdoor and indoor work. Therefore, it is necessary to have a different work pattern that promotes safety for the workers according to the work location.

This research was conducted at a telecommunications company that is engaged in managing network infrastructure services. Based on the company data, one of the categories of work accidents that has increased from 2016-2018 were those of falling from a height (100%) and contact with sharp objects (167%). One of the causes was due to low awareness of work safety behaviors, such as technicians not wearing PPE or not properly adhering to occupational health and safety procedures while working. According to Hester and Fusch (2020), enforcing safety climate and safety culture within the telecommunication technicians could minimize the risk factors and near miss or accident rate in the context of telecommunication company.

1.1 Objectives

Previous studies have discussed factors related to work safety behavior. In the context of different research objects, there were differences in safety behavior factors. Meanwhile, there is still no research that discusses the measurement of work safety behavior for the telecommunications sector, particularly the job of provisioning technicians. Therefore, the study aims to identify the safety behavioral factors that are relevant to the context of the provisioning technician. The results of the research can be used as a basis for developing relevant programs for improving safety behavior and can be used to measure safety behavior in other similar jobs.

2. Literature Review

According to the Government Regulation of the Republic of Indonesia (2012), occupational safety and health is an effort to prevent accidents and occupational diseases by ensuring the integrity and perfection of the workforce physically and spiritually. The purpose of occupational safety and health is to protect every worker for their right to safety in doing work for the welfare of workers and increase productivity and ensure the safety of everyone in the workplace.

Safety behavior is the knowledge and ability for certain behaviors and motivate oneself to do safe behavior (Neal, Griffin, and Hart, 2000). Self-report of safety behaviors and perceptions could offer an alternative criterion measure for determining workplace safety (Lu and Yang, 2010). A unidimensional model of the safety behavior construct which focuses on compliance with safety rules and procedures is inappropriate (Shen *et al.*, 2017). Therefore, the measure of safety behavior should use several factors.

There are three ways to find out individual behavior towards safety procedures, namely: 1) individual compliance with security procedures, 2) distinguishing two different sources of safety support (organizational security support and safety support from supervisors), and 3) special safety procedures of all safety rules and procedures that individuals work within their work (Hu, Griffin, and Bertuleit, 2016).

Organizational support is important for safety behavior because when employees perceive the organization as supporting safety, they enforce the safety rules and procedures that have been designed, supervisor support can influence compliance and safety through their influence on the perceived usefulness and perceived ease of use of each employee, the individual's role in compliance safety procedures involve an assessment process to follow rules that can help them achieve the desired safety results (Hu, Griffin, and Bertuleit, 2016).

3. Method

The research started with conducting a literature study to determine the development of research on safety behavior and safety behavior factors used in previous studies. There are 12 indicators that are relevant to the context of safety

behavior in the provisioning technician. According to Verma (2013), the minimum number of data set should be five per variable. Based on this rule, the sample must approximately 60. The indicators from literature study will then be extracted to determine the safety behavior factors that are relevant to exploratory factor analysis (EFA). The principal component analysis (PCA) extraction method was selected. As a rule of thumb, to access the significance of factor loadings, factor loadings of 0.3–0.4 are minimally accepted (Hair *et al.* 2010). To find out the number of factors formed based on the eigenvalue and scree plots. The factors formed from the PCA results were then analyzed based on internal consistency using the Cronbach Alpha value. The Cronbach Alpha value is greater than 0.6, indicating that this factor has an acceptable internal reliability value (Sekaran, 2003).

4. Data Collection

Data collection was carried out by distributing questionnaires to 179 provisioning technicians at a telecommunications company in the city of Bandung. There are 64 questionnaires returned (response rate 35,75%) and can be used for further data processing. Based on the respondent's profile, all respondents are male with the last education level is senior high school / vocational high school. Based on the age profile, most study respondents were in the age range 18-22 years (77%). The number of respondents aged 23-27 years was 20%, and respondents aged 28-33 years were 3%. In addition, none of the respondents were more than 33 years old. These results indicate that most of the provisioning technicians were of a very young age classified as the initial entry workforce. Based on the characteristics of the length of work, many respondents have worked for 1-3 years (48%). As many as 38% of respondents have worked for 3-5 years, and 14% of respondents have worked for less than one year.

5. Results and Discussion

Before performing PCA, the suitability of data for factor analysis was assessed using The Kaiser – Meyer – Olkin (KMO) criteria and Bartlett's test of sphericity. The larger value of KMO show more adequate sample to run the factor analysis. The KMO values between 0.5 and 0.7 are 'mediocre', values between 0.7 and 0.8 are 'good', values between 0.8 and 0.9 are 'great', and values above 0.9 are 'superb' (Verma, 2013). The results of data processing as shown in Table 1. The KMO value shows a value of 0.832 (include in 'great' category), it is greater than 0.5 so that the sample size needs can be met for factor analysis. Meanwhile, Bartlett's test of sphericity shows an approximate value of χ^2 of 263, 409 with a significance value of 0.000. The significance value of less than 0.05 indicates that there is a correlation between variables that is large enough to allow PCA to be carried out.

Table 1. Result of KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0,832
Bartlett's Test of Sphericity	Approx. Chi-Square	263,409
	df	64
	Sig.	0,000

To find out the number of factors formed, a scree plot mapping is performed as shown in Figure 1. The vertical axis describes the eigen value of the formed factors, while the horizontal axis shows the number of factors formed. To make it easier to understand the scree plot, a guideline is made on the vertical axis to find out how many indicators have an eigen value of more than 1. In Figure 1 it can be seen there are three points that have an eigen value of more than 1. Based on this, 12 indicators will be extracted in three predefined factors. Cumulatively, the three factors formed can explain 59.832% of the total diversity of items in the study.

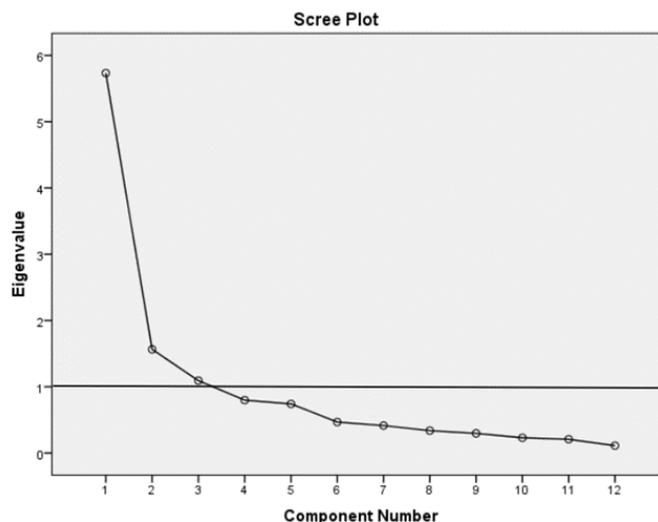


Figure 1. Scree Plot

After the factors were formed the next step is to test the reliability of the factors generated using the Cronbach Alpha value. The results of the grouping shown in Table 2 show that the Cronbach Alpha value for the formed factors ranges from 0.706 to 0.735. A Cronbach Alpha value greater than 0.6 means that the three factors formed are reliable. Based on these results, it can be seen the loading value is more than 0.4, so all indicators can be used to represent work safety behavior.

The first factor is safety concern, which relates to the perceptions of various parties (such as leaders and workers) regarding the importance of awareness to pay attention to safety at work. This factor is also considered important in Lu and Yang's research (2010). There are three indicators included in this factor, namely the team leader inspiring team members to support safety in the workplace (X3); the team leader provides a warning against safety behavior in the team at work (X4); and I believe that health and safety behavior in the workplace is very important (X9).

Table 2. Results of Factor Analysis and Reliability Testing

No	Factor	Alpha Cronbach Value	Item Code	Loading
1	Safety concern	0,735	X3	0,703
			X4	0,794
			X9	0,647
2	Safety compliance	0,735	X1	0,585
			X5	0,55
			X6	0,615
			X8	0,44
3	Safety participation	0,706	X10	0,818
			X2	0,81
			X7	0,636
			X11	0,757
			X12	0,581

The second factor is safety compliance, which explains the perceptions of workers regarding how they can comply with the applicable safety regulations and procedures. This factor consists of five indicators, where the two indicators with the highest loading values were: It is important to me to maintain safety when I work (X10) and I carry out the appropriate safety procedures in my line of work (X6). Several previous studies have also used this factor (Neal, Griffin and Hart, 2000; Lu and Yang, 2010; Hu, Griffin, and Bertuleit, 2016; Shen et al., 2017).

The third factor is safety participation especially on the willingness of workers to play an active role in work safety. The indicator with the highest loading value was that I am very sincere in carrying out tasks or activities that can help improve my safety at work (X11). There are four indicators in total that are relevant to this factor. This factor has also been used in various previous studies (Neal, Griffin and Hart, 2000; Lu and Yang, 2010; Hu, Griffin, and Bertuleit, 2016; Shen et al., 2017).

Overall, the factors found in this study are still in line with previous studies. The indicator with the largest loading value on the safety behavior of the provisioning technician was that: It is important to me to maintain safety when I work (X10) with a loading value of 0.818. Awareness to maintain safety while working was also a dominant item in Lu and Yang's research (2010) which examined safety behavior in container port workers. The results of this study can be used to compile program recommendations to improve safety behavior for provisioning technicians.

6. Conclusion

Safety behavior is still an issue that need to be seriously addressed in telecommunication company. The high level of accidental work related in the area is one indication of such. The results showed that there were three factors represented the safety behavior of the provisioning technician: the safety concern, safety compliance, and safety participation. The safety concern factor consists of three measurement indicators, the safety compliance factor includes five measurement indicators, while the safety participation factor consists of four measurement indicators. These three factors can explain 59.8% of the variation in the research data. The loading values on the 12 indicators are in the range 0.440 to 0.818. The factors found are still consistent with previous research but there are adjustments to the measurement indicators. The results of this study can be used to compile program recommendations to improve safety behavior for provisioning technicians. Safety cultures need to be promoted intensively in order to accustom workers with safety and become of their natural work behavior. Further research in the similar area with larger sample need to be conducted to find out whether the results stay and can be generalized.

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Biographies

Atya Nur Aisha is a Doctoral Student at Institut Teknologi Bandung, Indonesia. She is also Lecturer at Faculty of Industrial Engineering Telkom University, Indonesia. She earned bachelor and master's degree in industrial engineering from Institut Teknologi Bandung, Indonesia. She has several publications on international journals and conferences. She has research interest area related to human factors, ergonomics, human resources management and industrial management.

Fida Nirmala Nugraha is an Assistant Professor at Faculty of Industrial Engineering Telkom University. A psychologist with research area of interest that are related to Organizational and Educational Psychology and training. She earned doctoral degree from Padjadjaran University, Bandung, Indonesia. Some of the research publications are: Communication and Perceived Leadership, Preliminary Study: Psychological Contract after Merger, Psychological Climate and Psychological Contract Breach after Merger, Measuring Psychological Climate after Merger, Training Design to Improve Quality of Response: Training to Stimulate Application of Clarity Standard on The Elements of Thinking, Comparison of Job Evaluation Methods: Implications for the Salaries Design in Publishing Company.

Indi Erdiniaty is a professional worker. She earned bachelor's degree in industrial engineering from Telkom University, Indonesia. She experienced student internship program at a manufacturing company. Her research and professional interest related to human factors and human resource management.