

Relationship between Characteristics of Employee, Equipment Management, and Behaviour to Working Accident (Study on Fire and Rescue Service State Department, Central Jakarta)

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Abstract: National development has come to an era of industrialization and globalization marked by the development of industrial with an advanced technological process as part of the business model, this also means it is necessary to increase the quality of human resources and complete implementation of the Occupational Safety and Health Management System. The Occupational Safety and Health Management System is a part of the organizational management as a whole which cover organizational structure, planning, responsibilities, implementation, procedure and process, and many more in order to control the work-related risk to create safety work environment. This study aims to test the effect of Employee Characteristic, Equipment Management, Employee Behaviour to Working Accident. This study is using random sampling, and the number of selected sample is 130 people that work in Fire and Rescue Service State Department. Data collected by using a set of questionnaire that were given to selected sample, and this study is using Structural Equation Modelling for data analysis and interpretation.

Keywords: Employee Behaviour, Employee Characteristic, Equipment Management, Working Accident.

I. INTRODUCTION

National Development has entered the era of industrialization and globalization which is marked by the development of industry by utilizing high level of technology, thus it is necessary to improve the quality of human resources and the consistent implementation of occupational safety and health management systems [1][4][11]. Occupational Safety and Health Management is part of the overall management system which includes the organizational structure of planning, responsibilities, implementation, process procedures and resources needed to develop the achievement, review and maintenance of occupational safety and health policies in the context of controlling risks associated with activities work to create a safe workplace. The State Government from the Ministry of Manpower issued a regulation No. PER.05/MEN/1996, the regulation outlines the Guidelines for the Implementation of Occupational Safety and Health which consists of Commitments and policies, Planning, Application, Supervision, use of personal protective equipment and the reporting system of work accident statistics to cope with work accidents [2].

One of the responsibility that has higher risk of work accidents is firefighters. The main responsibility of firefighters is to respond to emergencies in various locations with a purpose to saving lives, rescuing and minimizing property damage [3]. Preparations for responding and prevention are also important aspects of his work. Firefighters work in an environment that is constantly changing and often unstable, therefore firefighters work is very heavy and in many situations, they will

require the use of special personal protective equipment. Occupational safety and health are one of the important aspect for the company to manage, because the impact of work accidents and diseases not only harms employees, but also the company both directly and indirectly [4]. There are several definitions of occupational safety and health defined by several experts, and basically the definition refers to the interaction of workers with the machines or equipment used, the interaction of workers with the work environment, and the interaction of workers with machines and the work environment. The main target of occupational safety and health is the workers, by making every effort in the form of prevention, maintenance and improvement of the health of the workforce, in order to avoid bad risks in doing work. The existence of safety and health guarantees can make workers feel comfortable and safe in doing a job, so as to minimize or even create zero conditions of working accidents and diseases [5].

Based on research conducted by the International Labor Organization (2017), every day, more than 2,78 million people die from work accidents or work-related illnesses per year. In addition, there are around 374 million injuries and illnesses due to non-fatal work accidents each year, many of which result in absenteeism from work every year [6]. The Manpower Social Security Organizing Agency has noted that the number of occupational accidents in Indonesia tends to continue to increase. As many as 123 thousand work accident cases were recorded during 2017. Throughout 2017, according to Manpower statistics [6], there was an increase in work accidents around 20% compared to 2016, nation wide. Total work accidents in 2017 amounted to 123 thousand cases with a claim value of more than 971 billion Indonesian Rupiahs. This figure increased from 2016 with a claim value of only 792 billion Indonesian Rupiahs. In Jakarta alone, there has been an increase in work accident up to 10% in 2017. The number of work accidents continues to show an increasing trend. The Manpower Social Security Organizing Agency Employment noted, in 2017, the number of reported work accidents reached 123,041 cases, while in 2018 it reached 173,105 cases with Work Accident Guarantee claims of 1,2 trillion Indonesian Rupiahs [7]. According to the International Labor Organization, there are 5 (five) main hazard controls such as elimination, substitution, engineering, administrative and personal protective equipment. Prevention is focused on the work environment, equipment and especially workers (humans) [6]. According to the Health and Safety Authority (2006), workers should have sufficient Work Safety and Accident knowledge to be able to identify hazards that exist in the workplace that could threaten him, the purpose of identifying the intended hazard is risk assessment by estimating the severity that will arise if the worker get a work accident, when the risk has been analyzed and assessed workers can make decisions about preventive measures, thus workers can avoid work accidents or can reduce the severity that will arise [7].

The accuracy and usefulness of the Personal Protective Equipment in Fire Fighting and Rescue, Central Jakarta is adjusted to the potential hazards faced. The type and design of Personal Protective Equipment has an influence on the level of work accidents. Several work accident cases state that workers who use Personal Protective Equipment have 2.2 times risk of occupational accidents compared to workers who do not use Personal Protective Equipment [8]. Every incident that causes serious injury, especially the death of a firefighter needs an in-depth analysis of the cause of the incident. Something ironic, helping fire victims but the safety of firefighters is not guaranteed [9].

According to data obtained from the annual report of the Central Jakarta Fire and Rescue Service Office (2017), from 2016 to 2018 the number of work accidents each year increases. In 2018, there are total of 27 accidents, increased from previous year, 25 number of accidents in 2017, while only 20 number of accidents in 2016 [10]. Based on data from the Fire Service and Fire Rescue Agency, Central Jakarta obtained in 2016 to 2018 that accidents increase because it is influenced by employee characteristics, equipment management, worker behavior towards working accidents.

A. Problem Statement

This study have multiple problem statement as follows:

1. Is there a connection between employee characteristics and working accidents at the Fire and Rescue Sub-Department Of Central Jakarta?
2. Is there a connection between equipment management and working accidents at the Fire and Rescue Sub-Department Of Central Jakarta?
3. Is there a connection between employee behavior and working accidents at the Fire and Rescue Sub-Department Of Central Jakarta?

B. Research Design

1. Research Framework

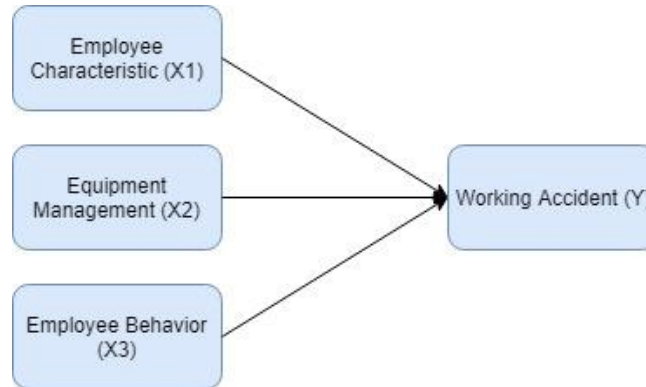


Fig.1. SEM Research Framework

2. Population, Sample Selection, and Dataset

The population used in this study is the total workforce of 192 firefighters in Jakarta area. The sample is a portion of all individuals who are the object of research. So the sample is an example taken from a portion of the study population that can represent the population. Sample in this study was taken using random sampling techniques, therefore, a number of 130 sample is selected from using random sampling. Data were collected using the observation method by conducting direct observations of research respondents on firefighters in the Central Jakarta Fire and Rescue Service Office. A set of questionnaire is used to obtain information about working accidents at the Fire and Rescue Service Office in Central Jakarta, each statements compiled based on things that have been determined so that it does not deviate from the research objectives.

3. Research Variable

This study is using Employee Characteristic (X_1), Equipment Management (X_2), and Employee Behavior (X_3) as independent variables, while using Working Accident (Y) as dependent factor.

4. Data Analysis

This study is using Structural Equation Model (SEM) for data analysis.

II. RESULTS AND FINDINGS

A. Univariate Analysis

TABLE: I

No	Item	No of Worker	%
1	Employee Characteristic		
A	Age		
	18–30	57	44%
	31–45	48	37%
	46–60	25	19%
	Total	130	100%
B	Working Period (Years)		
	< 10	20	15%
	11–20	40	31%
	21–30	55	42%
	> 30	15	12%

	Total	130	100%
C	Education		
	Highschool	25	19%
	Bachelor	68	52%
	Master	22	17%
	Ph. D	15	12%
	Total	130	100%
D	PPE Knowledge		
	Training	88	68%
	No Training	42	32%
	Total	130	100%
E	Behavior		
	Not Against	92	71%
	Against	38	29%
	Total	130	100%
2	Equipment Management		
A	Availability of PPE		
	Available	115	88%
	Not Available	15	12%
	Total	130	100%
B	PPE Accuracy		
	According to Type	117	90%
	Not the Type	13	10%
	Total	130	100%
C	PPE Maintenance		
	Good	124	95%
	Not good	6	5%
	Total	130	100%
3	Behavior		
A	Obedience		
	Obey	127	98%
	Not obey	3	2%
	Total	130	100%

It can be seen from table I above that productive age inside Fire and Rescue Service Department has been dominated by workers around 18 to 30 at 44%, This is because at the age of 18-30 many new employees enter the Fire Department. While there are 42% of senior workers with around 21 to 30 years of service, 52% of workers are bachelor-graduates. 68% of them also underwent PPE trainings during their working service, while the remaining 32% did not have any basic training for the proper use of PPE at work. This is due to the lack of enthusiasm for workers participating in PPE training and the lack of official budget to carry out training for all fire fighting employees. However, 29% of employees are against the proper use of the PPE at work, this is due to the attitude of the officials who are not clouded using PPE lack of respondents' knowledge and lack of PPE in the fire extinguisher service state department.

B. Bivariate Analysis

TABLE: II

No	Variable	p-Value	Remarks
1	Employee Characteristic (X ₁)	0.042	Significant
2	Equipment Management (X ₂)	0.018	Significant
3	Employee Behaviour (X ₃)	0.006	Significant

It can be seen from table II above that all of independent variables used in this study are proven to have significant relationship with dependent factor, Working Accident with a p-value less than 0.05 for each independent variable.

C. Multivariate Analysis

TABLE: III

No	Variabel	Coefficient	p-Value	OR	95% CI
1	Employee Characteristic (X_1)	-2.894	0.045	0.055	0.003–0.947
2	Equipment Management (X_2)	3.779	0.002	43.754	3.812–502.238
3	Employee Behaviour (X_3)	3.551	0.008	34.842	2.574–471.588
4	Constant	-7.293	0.001	0.001	0

Table III above shown the results of binary logistic regression by using backward stepwise method. The results of the multiple logistic regression shown the effect of employee characteristics to work accidents has p-value of 0.045 with a large influence of employee characteristics on working accidents can be seen from the OR value with a value of 0.055 which means that the results of the analysis show that employee characteristics have an impact on the likelihood of working accidents by 0.055 times. And table II also shown that the effect of equipment management to work accidents has p-value of 0.002 with a large influence of equipment management on working accidents can be seen from the OR value with a value of 43.754 which means that the results of the analysis show that equipment management have an impact on the likelihood of work accidents by 43.754 times. The effect of employee behaviour to work accidents has p-value of 0.008 with a large influence of employee behaviour on working accidents can be seen from the OR value with a value of 34.842 which means that the results of the analysis show that employee behaviour have an impact on the likelihood of work accidents by 34.842 times.

D. Hypothesis Testing

1. Employee Characteristic (X_1) to Working Accidents (Y)

This study resulting in the influence of employee behavior on the use of personal protective equipment (PPE) on work accidents based on respondents' responses was obtained as many as 127 respondents with a percentage of 97.7% and those who did not comply with PPE using 3 respondents with a percentage value of 2.3%. The results of the analysis found that there is a significant relationship between employee behavioral with work accidents in the fire department with a value of ρ -value of 0.008. The use of personal protective equipment that is required for all installation platform workers, namely (Safety shoes, Coverals, Work vests, safety goggles, helmets, and earplugs) while for certain types of work are required to use additional PPE such as body harness, SCBA, apron, welding goggles [5]. The results of the study showed that 50% of respondents adhered to using PPE and 50.0% were less adherent to using PPE. Based on the table above it is known that from 91 respondents, it was found that most respondents had bad behavior as many as 51 respondents (56%) compared to good work behavior consisting of 40 respondents (44%). The results of the frequency distribution of occupational accident risks are obtained mostly by the high risk of accidents of 56 respondents (61.5%), while the risk of work accidents is low by 35 respondents (38.5%). Of the 40 respondents who had good behavior, 18 respondents (45%) had a high risk of work accidents and 22 respondents (55%) had a low risk of work accidents. Statistical test results obtained p-value of 0,008 and it can be concluded that there is a relationship between Work Behavior and Employee Accident Risk. From the results of the analysis also obtained an OR value of 0.280, meaning that respondents who have good behavior have the opportunity 0.280 times to not be at risk of working accidents compared to respondents who have bad behavior. Workers who prioritize safety will work to prioritize safety and prevent the risk of possible working accidents, and vice versa workers who behave unsafe to work without prioritizing safety, such as never using PPE, and actions that often violate superiors or work procedure standards so that the risk of occurring accident higher [12]-[14]. Based on the theory of Domino, it is said that the causes of work accidents are unsafe behavior and unsafe condition. Unsafe behavior of unsafe actions or caused by humans is greater, namely 80-85% and the remaining unsafe condition (environment) behavior. Safe worker behavior will reduce the risk of work accidents, and vice versa if the behavior of workers is not safe the risk of work accidents will be higher [15].

2. Equipment Management (X_2) to Working Accidents (Y)

From the results of this study, it was found that the effect of the availability of PPE on work accidents based on respondents responses, was found that PPE that was available was 115 with a percentage of 88.5% and not available as

many as 15 with a percentage of 11.5%. The results of the analysis found that there is a significant relationship between the variable management of PPE availability with work accidents in the fire department with a p-value of 0.002. There are workers who consider the availability of PPE for workers more than workers who consider the availability of PPE is still not good (64.9%). Respondents who consider the availability of PPE are still less dominated by the contractor, because the contractor found it difficult to get PPE for free. Chi Square test results obtained significance values of 0.031 and the results of CI with a significance level of 95% so that statistically shows that there is no significant relationship between the availability of PPE with unsafe actions on workers.

3. Employee Behaviour (X_3) to Working Accidents (Y)

Respondents who have experienced working accidents are almost half of the total number of respondents and what often happens is that they are pierced by bendrat wire and pinched with iron. The majority of respondents are aged 21-30 years and have a low level of knowledge. The attitude of the majority of respondents has led to a positive attitude, but in carrying out their work there are still many who do not comply with work instructions [1]. The relationship between variables is the younger, the less knowledge and the more respondents are not compliant with work instructions, the higher the frequency of working accidents.

III. CONCLUSION

Based on results and findings that discussed on previous session, the conclusions are as follow. Employee Characteristic has negative and significant effect on Working Accident, Equipment Management has positive and significant effect on Working Accident, while Employee Behaviour has positive and significant effect on Working Accident. Characteristics of staff and equipment management in an agency have been proven to influence the behavior of employees in the Fire Control and Rescue Sub-Department in Central Jakarta City. Therefore work accidents and equipment management must continue to require effective supervision of the elements that influence both material and physical behavior so that accident rates do not increase from year to year. Considering the importance of equipment management within the agency, it is deemed necessary for the management of the Fire Fighting and Rescue Sub-Department in Central Jakarta City to pay attention to the factors that can have an effect on equipment management. One thing that can be done is to provide PPE as needed for firefighters, to provide care and maintenance of PPE in the workplace.

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International Journal of Novel Research in Humanity and Social Sciences

Vol. 6, Issue 6, pp: (174-180), Month: November - December 2019, Available at: www.noveltyjournals.com

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