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Factors related to work accidents among construction workers

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ABSTRACT

Accidents are unexpected events and it is not expected that in the event there is no element of premeditation, even more so in the form of planning. Accidents can inhibit project development, material losses, lost time, disability which can reduce the quality of life for workers and even death. Based on PT. PP (Persero) Tiffani Apartment Project, Kemang, South Jakarta, evaluating accidents form in April- September 2010, obtained 22 cases of work accidents than 96 construction workers. Statistical test using Chi Square to see the relationship between two variables. That is the variable age, years of work units and long working hours associated with workplace accidents on construction workers. The results showed that construction workers who suffered work accidents as many as 21 people (35%) and construction workers who did not suffer work accidents as many as 39 people (65%). From the results of statistical tests, variables related to the accident were age (p value = 0.003), years of work (p value = 0.007) and longer working hours (p value = 0.000). To reduce the number of accidents that occur on construction workers by training the young-old construction workers and increase the frequency of occupational health and safety training, to supervise a higher priority to the construction workers who are younger than 29 years, providing adequate rest periods for construction workers who work more than the normal working hours, making the work shift, giving rewards and punishments to the construction workers,

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1. INTRODUCTION

A work accident is an unwanted and unexpected event that can cause human and/or property casualties (PERMENAKER No. 03/MEN/1998). According to Suma'mur (1996), the definition of an accident is an unexpected and unexpected event. It is said to be unexpected because behind the event that occurred there was no element of intent or planning, while it was not expected because the accident was accompanied by material loss or caused suffering from the mildest scale to the most severe scale.

The occurrence of work accidents certainly makes a big problem for the continuity of a company. The losses suffered were not only in the form of material losses that were quite large, but more than that, there were casualties that were not insignificant in number. This loss of human

resources is a very big loss because humans are the only resource that cannot be replaced by any technology. The immediate losses from work accidents are medical expenses and accident compensation. While indirect costs that are not visible are damage to production equipment, better safety management arrangements, stoppage of production equipment, and lost work time. The amount of material losses arising from work accidents is very large. As an illustration, you can see the records of the National Safety Council (NSC) regarding work accidents that occurred in the United States. In America in 1980 work accidents have made a loss for the state of 51.1 billion dollars. This loss continues to increase every year along with the development of the industrial world in America (Saehu, 2011).

Several research results prove that several of the factors mentioned above are related to the occurrence of accidents in workers. From the results of research conducted by Kadarwati (2006) there is a relationship between age and years of service with work accidents at the Eyeglass Frame Factory of PT. Luxindo Nusantara Semarang. From the research conducted by Sari (2000) there is a relationship between work shifts and work accidents at the Ceramic Company PT. X Cikarang. The results of research conducted by Jawawi (2008) found a significant relationship between the workplace/unit and work accidents at PT. Hok Tong Pontianak (Crum Rubber Factory).

2. RESEARCH METHOD

In industrial safety, there is a basic premise that accidents can actually be prevented which is then poured into various accident prevention programs. Before understanding how accidents can be prevented, we must first understand the order in which accidents occur and their causes. Colling (1990) has noted crash theories

This theory was developed by Suchman and developed by Surry where there is a causal relationship between disease and environmental factors or a combination of situational characteristics including risk assessment which can be the cause or controller of accidents. An epidemiological model for the causes of accidents has been designed by Suchman and developed by Surry (in Colling, 1990). According to him, the phenomenon of an accident is an unexpected, unavoidable and unnoticed action resulting from the interaction of the host (worker), agent (machine/work), and environmental factors. This definition is closer to the definition of epidemiology as the study of the interactions between groups of people, agents, and the environment that cause disease.

According to this approach, injury and damage are measurable indicators of an accident, but the accident itself is the unintended, unavoidable, and unnoticed act that results from the interaction of the victim or the cause of the damage and environmental factors coupled with the situation involving the taking risk and perception of danger.

Methodthis is in line with those used for disease studies. In applying this approach one is looking for an explanation for the occurrence of an accident along with a group of people (accident victims), agents and environmental factors. are: age, gender, work shift, length of work, noise, lighting, chemical factors, workload, use of PPE, length of working hours and work units. The variables studied were age, years of service, units of work and hours of work. The gender variable was not examined because it was homogeneous (all workers were male), and the work shift variable was not examined because there were no jobs using shifts. The workload variable is not examined because this variable will be examined in the work unit variable. The variable use of PPE is not examined because all workers use PPE. As for the variables of noise, lighting and chemical factors were not investigated due to limited research tools.

The conceptual framework consists of dependent variables and independent variables. The independent variables consist of age, years of service, unit of work and length of working hours and work accidents are defined as the dependent variable. The relationship between some of these variables is described in the chart below.

3. RESULTS AND DISCUSSIONS

This type of research uses a quantitative approach using a cross-sectional design because in this study the independent and dependent variables will be observed at the same time (period).

The population of this research is the construction workers of PT. PP (Persero) Tiffani Project, Kemang Apartment, South Jakarta, which is still actively working, totaling 96 people. While the samples were taken using simple random sampling and took a sample of 60 construction workers representing the population using a different proportion test with the following formula:

$$n = \frac{[\, Z1\text{-}_{\alpha/2}\sqrt{2P\,(1\text{-}P)} + Z1\text{-}_{\beta}\sqrt{P1\,(1\text{-}P1) + P2\,(1\text{-}P2)}\,]2}{(P1\text{-}P2)2}$$

Information :

n 27

P : Mean proportion in the population {(P1 + P2)/2}

P1 : 0.69 (Proportion of workers who experience work accidents with work experience ≥ 5 years)

P2 : 0.26 (Proportion of workers who experience work accidents with work experience < 5 years)

Z21-⍰/2 : The degree of significance of ⍰ in the two-tailed test, ⍰ = 5%

Z1-⍰ : 90% test strength

Based on the calculation of the statistical test above, the number of samples obtained was 27 respondents multiplied by 2 to 54 respondents. To avoid missing answers from respondents, it is necessary to add 6 of the total sample, so that the total sample size is 60 people.

Data analysis

a. Univariate analysis

The analysis was carried out to see the distribution of frequencies and percentages of each independent and dependent variable desired from the distribution table.

b. Bivariate Analysis

The analysis was carried out to see the relationship between the independent and dependent variables by conducting the Chi Square test. Chi Square Equation:

$$X2=\frac{(O-E)2}{E}$$

Information :

X2 = Chi Square

O = Observed effect

E = Expected effect

This method (analysis) is to get the probability of its occurrence. If the P value ≥ 0.05 then Ho is accepted and Ha is rejected, which means there is no relationship between the two variables. Conversely, if the P value <0.05 then Ho is rejected and Ha is accepted, which means there is a relationship between the two variables.

Univariate analysis

Work accident data obtained by distributing questionnaires to respondents. The results of this study describe work accidents in construction workers at PT. PP (Persero) Project Tiffani Apartment, Kemang, South Jakarta, for more details can be seen in table 5.1

Table 1. Distribution of Occupational Accident Frequency in Construction Workers

No	Accident	Frequency	Percentage (%)
1	Yes	21	35%
2	Not	39	65%
	Amount	60	100%

The data above describes work accidents in construction workers at PT. PP (Persero) Kemang Apartment Tiffani Project 2010. A total of 21 construction workers (35%) had work accidents and 39 other construction workers (65%) did not experience work accidents.

Bivariate Analysis

The Relationship Between Age and Work Accidents in Construction Workers at PT. PP (Persero) Tiffani Project, Kemang Apartment, South Jakarta, 2010. Distribution of construction workers at PT. PP (Persero) Tiffani Project, Kemang Apartment, South Jakarta, based on the relationship between age and work accidents, can be seen in table 5.6 below:

Table 2. Cross tabulation between age and work accidents in construction workers

Age	Accident				Total		Pvalue	OR
	Yes		Not					
	N	%	N	%	N	%		
≤29 years	17	53,1	15	46,9	32	100		
> 29 years	4	14,3	24	85.7	28	100		
Total	21	35	39	65	60	100	0.003	6,8

The data above shows that out of 32 construction workers aged <29 years, 17 (53.1%) had work accidents. While 28 construction workers aged > 29 years as many as 4 people (14.3%) had work accidents. From the statistical test results, a P value of 0.003 was obtained. This means that at $\alpha = 5\%$ it can be concluded that there is a relationship between age and work accidents and the OR value is 6.8, which means that construction workers aged <29 years have an accident risk of 6.8 times greater than construction workers aged > 29 years .

4. CONCLUSION

The description of construction workers who had work accidents was 21 people (35%) and construction workers who did not have work accidents were 39 people (65%) The description of construction workers who were <29 years old was 32 people (53.3%) and workers construction aged > 29 years by 28 people (46.7%). The description of the working period of construction workers who are < 6 years is 30 people (50%), the description of the working period of construction workers who are between 6-10 years is 10 people (16.7%) and the description of the working period of construction workers who are > 10 years was 20 people (33.3%). The description of construction workers working in the structural unit is 23 people (38.3%), the description of construction workers working in the architectural unit is 21 people (35%) and the description of construction workers working in the mechanical/electrical unit is 16 people (26.7%). The description of construction workers who work > 8 hours/day is 32 people (53.3%) and construction workers who work < 8 hours/day are 28 people (46.7%) There is a relationship between age and work accidents with a Pvalue of 0.003 and OR=6,8. There is a relationship between length of service and work accidents with a Pvalue of 0.007. There is a relationship between long working hours and work accidents with a Pvalue of 0.000 and OR=19.

There is no relationship between work units and work accidents with a Pvalue of 0.483. 3%) and construction workers who work <8 hours/day for 28 people (46.7%) There is a relationship between age and work accidents with a Pvalue of 0.003 and OR=6.8. There is a relationship between length of service and work accidents with a Pvalue of 0.007. There is a relationship between long working hours and work accidents with a Pvalue of 0.000 and OR=19. There is no relationship between work units and work accidents with a Pvalue of 0.483. 3%) and construction workers who work <8 hours/day for 28 people (46.7%) There is a relationship between age and work accidents with a Pvalue of 0.003 and OR=6.8. There is a relationship between length of service and work accidents with a Pvalue of 0.007. There is a relationship between long working hours and work accidents with a Pvalue of 0.000 and OR=19. There is no relationship between work units and work accidents with a Pvalue of 0.483.

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