

The Effect of Knowledge, Characteristics, Unsafe Action and Unsafe Conditions on Workplace Accidents In PT Suzuki Indomobil Bekasi - Indonesia

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Abstract

Workplace accidents are unexpected incidents and cause losses that are the result of a series of incidents that involving causal factors, immediate causes which closely related to accidents, indirect causes, and basic causes. Based on work accident data of PT. Suzuki Indomobil Motor Plant II-4W Tambun, Bekasi, West Java, from 2011 to 2015 there were 11 cases of accidents in Section Welding.

This is a descriptive cross sectional study design that aims to determine the effect of knowledge, the characteristics of workers, unsafe actions and unsafe conditions with occupational accidents. The variables studied were knowledge, the characteristics of workers that the indicator consists of age, working period, unsafe action that consists of skill-base error, decision error, and routine violation, unsafe conditions that consists of the conditions of personal protective equipment, lighting, and noise, and workplace accidents. Data were analyzed by univariate and bivariate by using chi-square.

The results showed that workers injured at work in the past year as many as 10 workers (11.9%). From the results of statistical tests, the variables that have an impact is unsafe condition occupational accidents (p value = 0.030).

Based on research, the advices are that company needs to conduct training about occupational health and safety so that workers more aware of the potential dangers around their job, the active role from supervisor or inspector such a warning the workers when they work unsafely, increasing the quantity of personal protective equipment, do the periodically measurement of lighting system, and do the deep accident investigation.

Keywords : *Knowledge, Characteristics, Unsafe Action, Unsafe Conditions, Workplace Accidents*

Introduction

Industrial developments in Indonesia having a rapid growth, significantly contributing to national economic growth, such as creating jobs and becoming one of the main sources of state acquisition. But the development of this industry is not in line with the development of work environment conditions which can lead to workplace accidents¹. The number of cases of accidents in Indonesia is still high.

BPJS Ketenagakerjaan states that the number of workplace accidents in 2012 occurred 103,000 cases, in 2013 occurred 192,911 cases, 2014 occurred 129,911 cases, and in 2015 occurred 105,182 cases of

accidents. From that data, there are no significant changes made by companies in Indonesia to prevent accidents in the work area. The result of research the National Safety Council showed that the cause of accidents 88% due to unsafe action, 10% due to unsafe condition, and 2% from unknown cause².

From that statement, many work accidents due to the unsafe action. Other accident factors caused by misperceptions due to underestimation of a hazardous condition or an unsafe work environment, intentionally violation, and wrong priorities in doing the job³. The key to preventing accidents is to eliminate unsafe actions that affect for 98% causes of accidents⁴.

This research was held in PT. Suzuki Indomobil Motor Plant Tambun II as an automotive manufacturing. This industry uses raw materials such as iron plates and other car body components. The process includes in Welding Section are welding car components such as parts of the frame, under body, front floor, rear floor, side body, main body, door panels and floor decks. In Welding Section PT. Suzuki Indomobil Motor Plant Tambun II-4W Bekasi, West Java there are accident hazard factors such as pinched by welding equipment, splashed welding sparks, and scratched iron plate.

Based on accident rate at PT. Suzuki Indomobil Motor Plant Tambun II-4W in 2011 there are 6 accidents, 2012 occurred 2 accidents, in 2013 occurred 1 accident, in 2014 happened 1 accident, and in 2015 happened 1 accident. The types of accidents that injury by pinched tip gun, hit by pallet trolley which containing components, and pinched by holder upper gun. Observation in 2015 at Welding Section PT. Suzuki Indomobil Motor Plant II-4W Tambun, Bekasi, West Java, is known of the workers who did not use gloves and a helmet while working, and there are some workers who work while joking.

The type of study is a descriptive analytic study to get a descriptive of worker characteristics, unsafe actions, and unsafe conditions with workplace accident in Welding Section PT. Suzuki Indomobil Motor Plant Tambun II-4W. This study used a cross-sectional, dependent and independent variables observed at the same time. Population in this study were all workers in Welding Section PT. Suzuki Indomobil Motor Plant II-4W Tambun, Bekasi, West Java, as many as 497 workers. Sample which taken in this study using simple random sampling technique.

The assessment criteria which used for the questionnaire involving knowledge, worker characteristics such as age and working period, unsafe action such as skills-base error, decision error, routine violation, and unsafe condition such as the condition of personal protective equipment (PPE), lighting, and noise.

Method

The design of study was observational and cross sectional research for looking at unsafe act and unsafe condition on workplace accidents, as explaining the causality relationship between variables through hypothesis test. So that, this research is explanatory. The type of study is a descriptive analytic study to get a descriptive of worker characteristics, unsafe actions, and unsafe conditions with workplace accident in Welding Section PT. Suzuki Indomobil Motor Plant Tambun II-4W. This study used a cross-sectional, dependent and independent variables observed at the same time.

Population in this study were all workers in Welding Section PT. Suzuki Indomobil Motor Plant II-4W Tambun, Bekasi, West Java, as many as 497 workers. Sample which taken in this study using simple random sampling technique. Primary data in this study collected by observation using a questionnaire which spread to workers in Welding Section. The questionnaires have previously been tested for validity using SPSS Product Moment and reliability using SPSS Cronbach Alpha. The results of the questionnaire were declared all valid and reliable.

In this study, several stages were also carried out as follows: (1) editing; (2) coding; (3) scoring; and (4) tabulating

Univariate analysis is used to see an overview of the frequency distribution and the percentage of each variable (bound and free). The dependent variable consists of workplace accidents in Section Welding and Unsafe Behavior. Independent variables consist of knowledge, characteristics of workers (age and duration of work), unsafe behavior (skill errors, decision errors, and routine violations), and unsafe conditions (Personal Protective Equipment, lighting, and noise). The data analyzed by SPSS 17.00 using *chi-square* method (Bivariate analysis). Chi-square is one type of non-parametric comparative test performed on two variables, and the data scale of the two variables is nominal. Chi-square is an analysis test for categorical data types.

Results and Discussions

Table 1: The Effects of Knowledge with Workplace Accidents

Knowledge	Workplace Accidents				Total		P value
	Never Happened		Happened				
	N	%	N	%	N	%	
Good	71	84,52	10	11,90	81	96,42	1,000
Almost Good	3	3,57	0	0	3	3,57	
Not Good	0	0	0	0	0	0	
Total	74	88,09	10	11,90	84	100	

Source: Primary Data in 2017

Based on table 1, after statistical test of the effect of knowledge with workplace accidents in Welding Section PT. Suzuki Indomobil Motor Plant II-4W Tambun, Bekasi, West Java, it is known that the p value is 1.000. Based on the p value, there are no effect between knowledge with workplace accidents.

Table 2: The effects of worker characteristics with workplace accidents

Worker Characteristic	Workplace Accidents				Total		P value
	Never Happened		Happened				
	N	%	N	%	N	%	
Good	11	13,09	2	2,38	13	15,47	0,492
Almost Good	26	30,95	5	5,95	31	36,90	
Not Good	37	44,04	3	3,57	40	47,62	
Total	74	88,1	10	11,90	84	100	

Source: Primary Data in 2017

Based on table 2, after statistical test of the effect of worker characteristic with workplace accidents in Welding Section PT. Suzuki Indomobil Motor Plant II-4W Tambun, Bekasi, West Java, it is known that the p value is 0,492. Based on the p value, there are no effect between worker characteristic with workplace accidents.

Table 3: The effects of unsafe actions with workplace accidents

Unsafe Actions	Workplace Accidents				Total		P value
	Never Happened		Happened				
	N	%	N	%	N	%	
Safe	64	76,2	7	8,33	71	84,25	0,182
Almost Safe	10	11,90	3	3,57	13	15,47	
Not Safe	0	0	0	0	0	0	
Total	74	88,1	10	11,9	84	100	

Source: Primary Data in 2017

Based on table 3, after statistical test of the effect of unsafe actions with workplace accidents in Welding Section PT. Suzuki Indomobil Motor Plant II-4W Tambun, Bekasi, West Java, it is known that the p value is 0,182. Based on the p value, there are no effect between unsafe actions with workplace accidents.

Table 4: The effects of unsafe conditions with workplace accidents

Unsafe Conditions	Workplace Accidents				Total		Odds Ratio (CI 95%)	P value
	Never Happened		Happened					
	N	%	N	%	N	%		
Good	22	26,2	1	1,19	23	27,39	0,295 (0,104- 0,840)	0,030
Almost Good	51	60,71	7	8,33	58	69,04		
Not Good	1	1,19	2	2,38	3	3,57		
Total	74	88,1	10	11,9	84	100		

Source: Primary Data in 2017

Based on table 4, after statistical test of the effect of unsafe conditions with workplace accidents in Welding Section PT.Suzuki Indomobil Motor Plant II-4W Tambun, Bekasi, West Java, it is known that the value of the odds ratio is 0.295 and p value is 0,030. Based on Odds Ratio, unsafe conditions have a risk of 0.295

times to cause work accidents. Based on p value, there are effects of the unsafe conditions with workplace accidents.

Workers in Welding Section PT.Suzuki Indomobil Motor Plant II-4W Tambun, Bekasi, West Java who have good knowledge and never have workplace accident as

many as 71 people (84.52%), workers who have almost good knowledge and never have workplace accidents as many as 3 people (3.57%), and workers who have good knowledge and have workplace accidents as many as 10 people (11.9%). According with the opinion of Shappel⁵ states that inadequate knowledge of the existence of risks and hazards and workplace accidents will make the worker do unsafe acts and harms his safety. They only know but not understand and apply it to a safe action. This condition will be more severe if the work environment is less supportive of the implementation of safe action at work⁶. According to L. Green⁷, behavior can be formed by three factors, one of which is the enabling factor, namely the availability of health facilities. Availability of personal protective equipment is one form of behavioral supporting factors. An automatic behavior has not materialized in an action if there are no facilities which support the formation of such behavior.

Workers who have good characteristic and never have workplace accidents as many as 11 people (13,09%), workers who have almost good characteristic and never have workplace accident as many as 26 people (30,95%), workers who have not good characteristic and never have workplace accident as many as 37 people (44.04%), workers who have good characteristic and have workplace accidents as many as 2 people (2.38%), workers who have almost good characteristics and have workplace accidents as many as 5 people (5.95%), and workers who have not good characteristic and have workplace accidents as much as 3 people (3,57%). Accidents are not only caused by work equipments, but also because of the tendency of the worker to be accident (accident proneness). "Accident proneness" is the fact that for certain workers there are signs of a tendency to have an accident. Research shows that 85% of the causes of small accidents are due to human factors^{8,9}.

This is not according with the WHO Study Group study which states that there is a corellation between age of the worker and the frequency of the occurrence of work accidents. Based on the Doewes study, it is known that the incidence rate of accidents is lower in older workers (45 years and over) than workers in younger ages (24 years and under) and prime age workers (25-44 years)¹⁰.

Workers' working period if associated with work experience can affect workplace accidents. Especially experience in terms of using various work equipments. More longer working period of workers, more experience will be gained and allowing the worker to work more safely¹¹. Experience is the whole that person gains from the occurrence they through, it means person experience can affect their behavior in the life of their organization. Therefore, more longer workers' working period life, more experience they get that making workers to work more safely¹¹.

Workers in Welding Section PT. Suzuki Indomobil Motor Plant Tambun II-4W who have safe action and never have workplace accident as many as 64 people (76.2%), workers who have almost safe action and never have workplace accidents as many as 10 people (11.90%), workers who have safe action and have workplace accident of 7 people (8.33%), and workers who have unsafe action and have workplace accidents as many as 3 people (3.57%). The old concept in occupational safety management states that 85-96% of accidents are the result from unsafe acts or unsafe behavior. The results of research in quality control concluded that unsafe acts performed by workers is the result of a set of factors where management actually has control and responsibility to improve it. From that new concept, it is expected that the management tries to make a management system to improve workers behavior, and workers can work well according to standards¹².

Condition of personal protective equipment (PPE) in Welding Section PT. Suzuki Indomobil Motor Plant Tambun II-4W is less flexible so that workers feel uncomfortable when using the PPE. Moreover, personal protective equipment is also not sufficient with the number of workers and the types of personal protective equipment is not complete as required. Personal protective equipment is not sufficient with the number of workers due to the delay of suppliers of PPE in delivery PPE, so that when workers want to take the PPE before starting work, the PPE is not yet available.

In the lighting aspect, it was found that the worker was tired of the eye muscle while working, workers claiming that the room light was uncomfortable, and the illumination of the electric lights when cloudy and at the evening was not enough. Based on secondary

data from lighting measurement in February 2016 there are 8 of 20 measurement points in Welding Section PT. Suzuki Indomobil Motor Plant Tambun II-4W still does not according with minimum lighting level from regulation of Health Minister Number 1405 concerning Health Requirements for Office and Industrial Work Environment that is 300 lux for routine job, on machine work and assembling. Measurements are made in February 2016 so that routine measurements should be made regularly to better known not sufficient lighting points and inadequate regulation.

In the noise aspect, it is found that workers concentration feel disturbed when working. Workers can understand what the other person said after paying attention to his lips movements, this indicates that some workers are degrading of hearing quality and will cause workplace accidents if workers fail to get danger warning information at work because they can not hear clearly. Secondary data from noise measurement on November 21, 2016 states that the noise in the area of Welding Center of Production Line about 82.3 dBA, Welding APV Line area about 80.76 dBA, and Welding Futura Line area about 76.5 dBA. All three measurement results are eligible Threshold Limit according with regulation of Health Minister.

Conclusion

Unsafe conditions which include the condition of personal protective equipment, lighting, and noise to workplace accidents can be concluded that there is a significant effect on workplace accidents with a p value = 0.030 and odds ratio of 0.295 which means workers who work in a work environment that is not safe has a chance of 0.295 times having a work accident compared to workers who work in a safe working environment.

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