

# Relationship of Age, Work Period, and Education Level with Occupational Accidents in the South Borneo Coal Industry

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## Abstract

**Research Background:** Occupational health and safety (OHS) is an effort to create a working atmosphere that is safe, comfortable, and the ultimate goal is to create the highest productivity. The higher level of production in the coal industry will be in line with the dangers and risks of work accidents in the coal industry. Occupational accidents are influenced by 2 (two) direct causes namely unsafe action (unsafe action) and dangerous condition (hazardous condition) **Research Methodology:** The research design used in this study is observational analytic with the cross-sectional approach with a large sample of 80 respondents who in the South Borneo coal industry. Data analysis used the statistical test *Chi-Square* ( $\alpha = 0.05$ ). **Result:** From the results of the bivariable significance test using the Chi-Square test showed that the significant value of age ( $p = 0.604$ ), years of service ( $p = 0.544$ ), level of education ( $p = 0.578$ )  $> 0.05$ . **Discussion:** There is no significant relationship between the variables of age, years of service, education level with work accidents in the South Borneo coal industry.

**Keywords:** OHS, Age, Work Period, Education Level, Work Accident.

## Introduction

Occupational health and safety (OHS) are an effort to create a working atmosphere that is safe, comfortable, and the ultimate goal is to create the highest productivity. OHS is essential to be carried out in every type of work without exception. OHS implementation can reduce work accidents to increase work efficiency and productivity<sup>1</sup>.

Borneo is known as one of the islands with abundant natural resources, one of which is coal. Many people use coal's natural wealth as an alternative energy source

that is believed to be profitable because of its relatively cheap price<sup>2</sup>.

The higher level of production in the coal industry will be in line with the dangers and risks of work accidents in the coal industry<sup>3</sup>. Work accidents are a problem for business continuity from all industrial sectors<sup>4</sup>. The loss suffered not only in the form of significant material losses, but more than that is the occurrence of casualties that are not small in number. This loss of human resources is enormous because humans are the only resource that cannot be replaced by any technology<sup>5</sup>.

Accidents do not happen by accident, but there is a reason. Because there is a cause, the cause of the accident must be examined and discovered so that further with corrective actions aimed at the purpose as well as with further preventive efforts, accidents can be prevented, and similar accidents do not recur<sup>6</sup>.

According to HW, Heinrich, in the occurrence of work accidents, is influenced by 2 (two) direct causes, namely unsafe actions (unsafe actions) and hazardous

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conditions (dangerous conditions)<sup>7</sup>. The perilous act is an action that does not meet safety, so it is risky to cause work accident<sup>8</sup>. Unsafe conditions are unsafe environmental conditions and risk of causing work accidents<sup>9</sup>.

According to Sholihah , four moving factors in a single chain can cause work accidents, namely. In essence, environment, equipment, danger, and humans, apparently work physical environmental factors do not only influence accidents, but one of the essential elements is human<sup>10</sup>.

The place of this research is a coal mining company located in the area of South Borneo, which is one of the companies that has implemented an excellent OSH system following applicable regulations and is supported by the commitment of top management to the OSH implementation system in the company. When running the production process, the South Borneo coal industry has a high risk of accidents due to work.

The results of work accident data in the coal mining industry in South Borneo from January 2017 - August 2019 show the prevalence of work accidents has increased every year with the number of events in 2017 totaling 27 incidents, in 2018 totaling 34 incidents, and in January 2019 until August 2019 there were 38 cases of workplace accidents. This certainly needs attention

because it is directly related to occupational health and safety.

### Materials and Methods

This research has a quantitative approach. Based on aspects of data collection, this type of research is observation because it only makes a comment or observation without providing intervention to the variables examined.

This research is categorized as a *cross-sectional study* because data collection from dependent and dependent variables is carried out at one time, that is when the research is in the field. The population in this study were all workers in the South Borneo coal industry company of 100 workers. Based on sample calculations using simple random sampling, the samples in this study were 80 workers in the South Borneo coal industry.

Data collection uses a questionnaire or questionnaire method that includes the relationship of age, years of service, and education level with work-related accidents.

### Result

The results of the study show the characteristics of the respondents of workers in the Borneo Selatan coal industry, seen as covering age, sex, education, and years of service.

**Table 1. Distribution of Age Frequency, Years of Service, Level of Education Workers in the South Borneo coal industry.**

Variable	Respondents	
	Amount	Percentage (%)
Age		
Young	43	53.8
Old	37	46.2
Total	80	100%
Working Period		
≥ 5 Years	55	72.5
<5 Years	25	27.5
Total	80	100%

**Cont... Table 1. Distribution of Age Frequency, Years of Service, Level of Education Workers in the South Borneo coal industry.**

School Level		
Elementary School	4	5.0
School	9	11.2
High School	67	83.8
Total	80	100%

Analysis Relationship between age and work accident at the South Borneo coal industry.

**Table 2. Analysis of Relationship between Age and Work Accident in South Borneo coal industry.**

Age	Work Accident				Total		p.value
	Ever		Never				
	n	%	n	%	n	%	
Young	22	51.2	21	48.8	43	100	0.604
Old	22	59.5	15	40.5	37	100	

Bivariable test results using the Chi-Square test indicate that p-value = 0.604 > 0.05, which means there is no significant relationship between age and work accident at the South Borneo coal industry.

Analysis of the Relationship between Work Period and Work Accident in Workers in the South Borneo Coal Industry.

**Table 3. Analysis of Relationship between Work Period and Work Accident in Workers in the South Borneo Coal Industry.**

Work Period for Work	Accident				Amount		p. value
	Ever		Never				
	n	%	n	%	n	%	
<5 Year	12	48.0	13	52.0	25	100	0.544
≥5 Year	32	58.2	23	41.8	55	100	

Test results using the test *Chi-Square* indicate that the value of p = 0.544 > 0.05, which means there is no significant relationship between work period with work accidents in the South Borneo coal industry.

Analysis of the Relationship between the level of education of workers and workplace accidents in the South Borneo coal industry.

**Table 4 Analysis of the Relationship between Education Level and Work Accident in Workers in the South Borneo Coal Industry.**

Education Level	Work Accident				Total		p.value
	Ever		Never		n	%	
	n	%	n	%			
Elementary School	3	75.0	1	25.0	4	100	0.578
School	6	66.7	3	33.3	9	100	
High School	35	52.2	32	47.8	67	100	

Bivariable test results using the test *Chi-Square* showed that the value of  $p = 0.578 > 0.05$ , which means there is no significant relationship between the level of education with work accidents in the South Borneo coal industry.

### Discussion

Age relationship with workplace accidents in the South Borneo coal industry.

Based on the analysis of the relationship between age and work accidents among workers in the South Borneo coal industry shows that there is no significant relationship between age and work accidents in the South Borneo coal industry. These results are in line with research conducted by Himawan, which explains that there is no age relationship with workplace accidents where older workers tend to be vulnerable to disasters but have excellent safety performance. Younger workers are not prone to injury, but safety performance is not optimal. The age and experience of the workers themselves go hand in hand in determining the conditions and safety status for that, and the company must be careful in managing its human resources<sup>11</sup>.

#### Relationship between a work period and a work accident in South Borneo coal industry.

Based on the results of analysts, the relationship between work tenure with work accidents in workers in the South Borneo coal industry shows that there is no significant relationship between work tenure and work accidents in the South Borneo coal industry. This study is in line with research conducted by Hikmawan, which is a study entitled the factors associated with workplace accidents in car painting shop workers in Makassar showed that there was no relationship between work period with work accidents<sup>12</sup>.

According to Shintia, workers who have worked long hours in a place will slowly experience burnout because the same workers have been repeated, while burnout is one of the factors workers act at will or neglect at work, which will have a higher impact to cause work accident. Workers with more extended service periods are more likely to consider themselves trained or proficient in what they have done so often that they act as they please and do not comply with the rules in the company<sup>13</sup>.

The working period is directly related to work experience, the longer the work period of a person, the higher the experience and flight hours of the worker, so that workers will be able to understand better how to work safely to prevent themselves from work accidents. New workers generally do not know the ins and outs of work deeply. Conversely, with the increase in the work period of a workforce, so will the knowledge and skills of workers and the safety aspects of the work have done.

#### Relationship between the level of education of workers and workplace accidents in the South Borneo coal industry.

Based on the results of analysts, the relationship between the level of education with work accidents on workers in the South Borneo coal industry shows that there is no significant relationship between the level of knowledge with work accidents in the South Borneo coal industry. The results of this study are in line with research conducted by Ada which states that there is no significant relationship between the level of education

of workers with work accidents at PT General Electric Lighting Indonesia. Research conducted also explained that the variable level of schooling ( $p$ -value > 0.05) did not find a significant relationship with the incidence of workplace accidents in the PT Antam Tbk Mining area.

In theory, the level of education should affect the intelligence or knowledge of a worker. But workers with any educational background do not mean less knowledge and experience. The still high incidence of workplace accidents occurring to workers both workers with primary, junior high, or high school education may be caused because most workers are workers with non-organic (contracted) or non-permanent work status and have not received training on Occupational health and safety (OHS)<sup>14</sup>

Nugroho's explanation (2018) also explains that the lack of knowledge of workers (*lack of knowledge and skills*) is one of the human factors or (*unsafe actions*) that can cause workplace accidents. But there are still many (*dangerous actions*) that may occur and not examined by researchers such as the inability to work typically (*inadequate capacity*), not functioning of the body due to bodily defects, attitudes and unsafe behavior (*unsafe attitude and habits*), *fatigue and boredom, confusion and stress* due to work procedures that are not yet understood, decreased concentration (*difficulty in concentrating*) of labor while doing work, indifference (*ignorance*) from energy, lack of spirit of work motivation (*improper motivation*), and lack of satisfaction at work (*low job satisfaction*). Also, there are still (*unsafe conditions*) that can be the cause of workplace accidents, such as the environment in which the worker works, work processes, nature of work, work systems, and work organization that does not pay attention to aspects of work safety<sup>15</sup>.

### Conclusion

Characteristics of workers in the South Borneo coal industry are found in the age category of the young group, the length of service category is more than five years, the highest level of education for workers in High School.

There is no relationship between age and work accidents in the South Borneo coal industry.

There is no relationship between work periods with work accidents in the South Borneo coal industry.

There is no relationship between education level and work accidents in the South Borneo coal industry.

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