

Safety and Health Implementation Study Work in Coal Mining Companies (Case Study: PT. Buana Eltra)

By Mohammad Zulkarnain

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Abstract

This study aims to analyze the implementation of safety and health in the coal mining company PT Buana Eltra. Analyzing the implementation of operational management, the implementation of work environment management, the implementation of occupational safety management and the implementation of occupational health and analyzing the factors that influence the implementation of occupational safety and health in the coal mining company PT Buana Eltra. This research is an analytic study with a statistical descriptive approach. Descriptive statistics research is research that aims to get a picture by studying the dynamics of data from respondents based on the results of the questionnaire in analyzing priority factors. Primary data obtained from respondents are used as a means to obtain information or data carried out by field surveys through direct observation and interviews with respondents within the company and secondary data obtained from PT Buana Eltra which are collected and compiled according to research problems and conducted in a literature study. Data were analyzed using the SPSS (factor analysis) program to analyze the factors that influence the implementation of occupational safety and health in the coal mining company PT Buana Eltra.

Keywords

Occupational health and safety, safety and health implementation, influence the implementation of occupational safety and health

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1. INTRODUCTION

The mining industry must pay attention to the safety and health of its workers, the company must always strive so that its workers are always safe and healthy, meaning that there are no accidents (zero accidents) or occupational diseases (Budiarto, 2011). Occupational safety and health is a thought and effort to guarantee the wholeness and perfection of both the physical and spiritual workforce in particular, and humans in general are the results of work and culture towards a just and prosperous society (Djarmiko, 2006). Work safety is safety related to machines, work tools, materials, and processing processes, the workplace foundation and its environment and ways of doing work. Work safety has the nature of, namely, the work environment, the technical nature of Redjeki (2016). Accidents can occur by several complex factors that affect one another. Coal mining is a very high risk industry in the mining / production process (Suma'mur, 1997).

Mine accidents occur due to human negligence and unsafe environment and the lack of company management, not

optimal in managing aspects of occupational safety and health. Prevention of work accidents, that is, with laws and regulations, established standards, supervision, technical research, medical, psychological and statistical research, education and training, excitement of safety, insurance and company management commitments, mining accidents can be minimized (Isnaeni et al., 2017). This is based on the fact that the coal mining industry, both open pit mine and underground, has a high level of risk of work accidents and is one of the highest-risk jobs in the world. (Arif et al., 2014). The process in coal mining, namely, land clearing is the clearing of mining land by cutting trees and removing everything that inhibits mining activities, removing topsoil is taking and moving the top of the shoots collected in top soil reservoirs while the stockpile, removing the overburden layer is stripping overburden, digging and loading is extracting coal and loaded into a truck to be transported to a temporary stockpile.

Potential hazards in the mining/production workplace, namely, blasting, fires, material traps, mine traffic accidents,

equipment operation accidents, landslides. Based on number 4 of year 2009, coal mining activities have characteristics including, capital intensive (large capital), non-renewable reserves, levels, large risk (high risk), tends to damage the environment and remote location. Mining activities that are in accordance with these characteristics, in the context of applying good and sustainable mining technical principles based on statutory provisions. Done with the implementation of occupational safety and health. This is an effort to obtain operational conditions that are safe, efficient, productive and sustainable. Another condition is the lack of awareness of the majority of the company community, both company management, contractors, employers and workers of the importance of occupational safety and health. Based on data from the Indonesian Mining Services Association, it was recorded that by the end of 2018 there had been 116 work accidents with details of minor injuries 47 times, severe injuries 52 times, and 17 times death. The causative factors of the accident consist of 2 (two) categories namely, personal factors and occupational factors. The percentage of personal factors causing the accident is 45% of the lack of knowledge of workers, 39% of wrong motivation, and 16% of the lack of skills.



Figure 1. Graph of Results of Implementation of PT Buana Eltra Operational Management Implementation

Percentage of causes of work factors, 45% due to lack of work standards, 16% from lack of leadership and supervision quality, 11% from lack of leadership quantity, 9% from lack of communication and coordination, 7% from lack of material / tools and equipment, 4% from lack of maintenance, 3% of engineering and procurement kuragnya, and 2% of work hazards that have not been identified properly. The types of accidents that often occur from mining hazards include explosions, landslides, fires, poisoning, dust, material accident, mine traffic accidents, equipment operation accidents, drowning, electric shock, impact, collision, fall, fall, slip, pinched, cut off, and bursts with hot water. Based on data from the Department of Energy and Mineral Resources of South Sumatra Province in 2015 until Mid-2019, 147 work accidents have been recorded, with details of minor injuries 117 times, severe injuries 21 times, and 4 times dead. Based on data from one of the coal mining companies in South

Sumatra Province (called PT A.J) explained that there have been at least 27 incidents in the period 2015 to mid-2019, incidents that occurred, 12 times on the hauling road, 5 times in the Whorshop, 5 times at the PIT site, 2 (two) times at the stockpile, 1 time at the disposal site (dumping), 1 time at the parking lot and 1 time food poisoning. The types of incidents that occur are, fire, poisoning, material accident, mining traffic accidents and equipment operation accidents, falling and slipping. This can cause huge material losses for the company, reduce production and cause employees to experience defects, injuries, stress, obstructed productivity and even potentially dead. The impact of coal mining activities on public health among Juniah et al. (2013) namely, coal production activities and the level of coal production, the level of mountaintop coal production increases the percentage of public health disorders. In-depth studies need to be carried out related to the implementation of occupational safety and health that has been run by the company, so that it can know the indicators that affect the safety and health of work in mining companies that are safe, efficient, productive and sustainable.

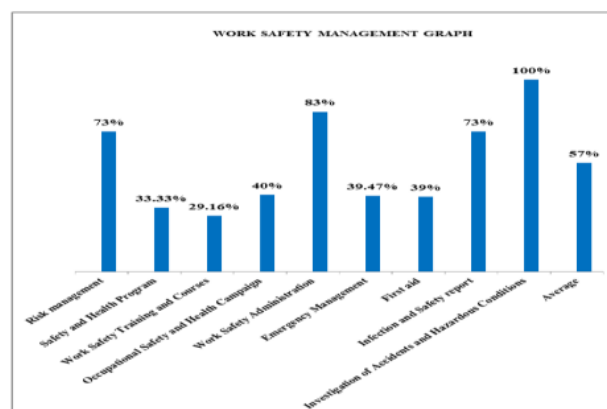


Figure 2. Graph of Implementation Results of the Implementation of Work Safety Implementation of PT Buana Eltra

Table 1. KMO and Bartlett's Test

KMO and Bartlett's Test	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	736
Bartlett's Test of Sphericity	
Approx. Chi-Square	3957.384
df	276
Sig.	0

Table 2. Communalities

	Communalities	
	Initial	Extraction
Age	1.000	861
Education	1.000	850
Workers' Mental and Physical Abilities	1.000	713
Workers' Mental and Physical Abilities (sertifikasi)	1.000	893
(sertifikasi)		
wrong motivation	1.000	463
Worker Behavior / Attitude	1.000	913
Stress (physical)	1.000	862
Relations between workers and other groups of workers	1.000	795
Use of Personal Protective Equipment	1.000	862
Condition of mining machinery and equipment	1.000	682
Maintenance of mining machinery and equipment	1.000	793
Feasibility of the tool	1.000	775
The lifetime of the equipment	1.000	756
Noise	1.000	744
Air temperature and weather	1.000	753
The level of lighting at the mine site	1.000	830
Road conditions, and road slope	1.000	871
K3 general policy (safety policy)	1.000	929
Health Support	1.000	725
Technical instructions for carrying out hazardous work	1.000	653
Occupational Safety and Health Education / Training	1.000	684
Work standards and rules	1.000	513
Quality of leadership and supervisors	1.000	531
Quantity of leadership and supervision	1.000	663

2. EXPERIMENTAL SECTION

2.1 Material

This research was conducted at the coal mining company PT Buana Eltra, the data needed in the study these are: primary data and secondary data. Primary data were obtained from respondents who used as a means to get information or data that is done in a manner field survey through observation and direct interviews with respondents in company. Secondary data were obtained from PT Buana Eltra.

2.2 Method

Data which was analyzed using this approach is from the results of the questionnaire which is obtained. Descriptive statistical analysis is used to describe the implementation conditions Safety and Health at PT Buana Eltra with integrating the results of text analysis and data interpretation.

3. RESULTS AND DISCUSSION

3.1 Implementation of Mining Operational

Based on figure 1 the achievement of the implementation of PT Buana Eltra's operational management, which consists of several indicators, namely, the percentage of work oper-

ating procedures 67%, special work permits 0%, personal protective equipment and work safety equipment 89%, organization and personnel 33.3% and program supervision 75%. The percentage of the implementation of operational management is 67.32%.

3.2 Implementation of Work Safety Management Implementation

Based on figure 2, the percentage of achievement of the implementation of PT Buana Eltra namely, risk management 73%, program 33.33%, courses and training 29.16%, campaign 40%, work safety administration 83%, emergency management 39.47%, first aid in safety, infection and report 73%, and work accident investigation 100%. There are indicators that have not been properly and maximally applied. Such as risk management, programs, work training and courses, campaigns, emergency management, first aid in accidents.

3.3 The Implementation of Occupational Safety and Health of PT Buana Eltra

Based on figure 3, the implementation that has been implemented by coal mining company PT Buana Eltra, namely:

Table 3. Variance explained

No	Initial Eigenvalues			All Variance Explained			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.083	29.511	29.511	7.083	29.511	29.511	3.707	15.448	15.448
2	3.197	13.323	42.834	3.197	13.323	42.834	3.037	12.656	28.103
3	2.292	9.549	52.382	2.292	9.549	52.382	2.92	12.165	40.268
4	1.824	7.598	59.981	1.824	7.598	59.981	2.628	10.948	51.217
5	1.436	5.985	65.966	1.436	5.985	65.966	1.971	8.213	59.43
6	1.233	5.136	71.102	1.233	5.136	71.102	1.941	8.089	67.518
7	1.046	4.357	75.459	1.046	4.357	75.459	1.906	7.94	75.459
8	927	3.864	79.323						
9	829	3.456	82.779						
10	684	2.85	85.629						
11	548	2.282	87.911						
12	529	2.204	90.115						
13	429	1.786	91.901						
14	417	1.738	93.639						
15	325	1.353	94.993						
16	278	1.159	96.151						
17	228	951	97.102						
18	207	864	97.966						
19	180	751	98.717						
20	122	508	99.225						
21	70	291	99.516						
22	60	250	99.766						
23	34	143	99.909						
24	22	91	100						

the percentage of operational management 71.32%, work environment management 65%, work safety management 57%, occupational health 36%. The percentage of achievement of the implementation of the implementation of Occupational Safety and Health of PT Buana Eltra 57.33%.

Based on Table 2, the communalities table above, the age variable is 0.861. This means that about 86.1% of the variance of the age variable can be explained by the error formed. The wrong motivation variable is 0.463, this means that 46.6% variant of the wrong motivation variable cannot be explained by the factors formed. Likewise for other variables. The smaller the value of communalities means the weaker relationship with the factors formed.

In the all variance table explained (Table 3) shows that there are 7 (seven) factors that are formed from 24 (twenty four) variables of each eigenvalue factor ≥ 1 (one). Factor 1 (one) eigenvalues f 7.083 with variance (29.511%), factor 2 (two) eigenvalues of 3.197 with variance (13.323%), factor 3 (three) eigenvalues of 2.292 with variance (9.549%), factor 4 (four) eigenvalues of 1.824 with variance (7.598%), factor 5 (five) eigenvalues of 1.436 with variance (5.985%), factor 6 (six) eigenvalues of 1.233 with variance (5.136%) and factor

7 (seven) eigenvalues of 1.046 with variance (4.357%).

The scree plot graph above explains the relationship between the number of factors formed and the eigenvalue in the graph. It is explained in the table of total variance explained that many factors formed are seen from the eigenvalue. Factors that are formed if eigenvalue ≥ 1 . From the picture above, the number of factors formed from 24 variables is 7 factors.

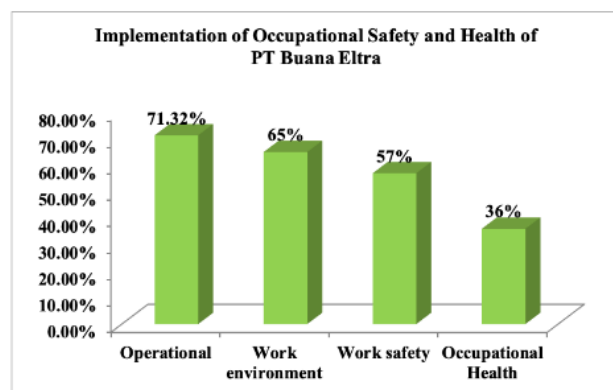
Based on the rotated component matrix Table 4 the loading factor value of each variable. Factor loading is the magnitude of the correlation between the factors formed by these variables. In the previous table it is known that of the 24 variables 7 (seven) factors have been formed. These factors are filled by several variables, it can be seen in the table above that there is the highest number in each variable that has been painted in yellow. This figure shows the position of the variable in 7 (seven) factors that have been determined.

4. CONCLUSIONS

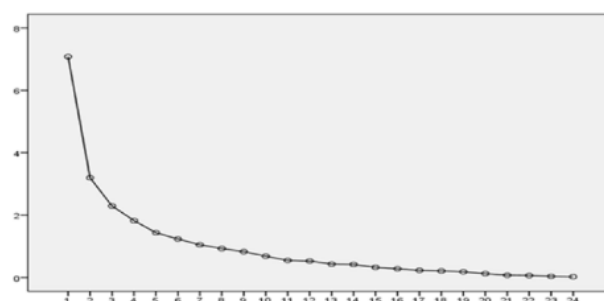
The implementation that has been carried out by PT Buana Eltra company is operational management 71.32%, imple-

Table 4. Rotated Component Matrix

	Rotated Component Matrixa						
	1	2	3	4	5	6	7
Age	415	276	82	312	-109	704	-1
Education	72	836	231	255	-107	56	111
Workers' Mental and Physical Abilities	293	552	389	-176	-339	151	48
Workers' Mental and Physical Abilities (sertifikasi)	891	23	153	95	205	138	-65
wrong motivation	237	489	204	120	272	193	5
Worker Behavior / Attitude	59	136	155	909	-25	194	35
Stress (physical)	873	40	148	79	212	146	-67
Relations between workers and other groups of workers	479	-615	246	7	-71	-13	348
Use of Personal Protective Equipment	37	839	256	264	-58	73	110
Condition of mining machinery and equipment	-46	73	234	-16	-25	59	784
Maintenance of mining machinery and equipment	299	-55	102	4	817	-89	117
Feasibility of the tool	207	-14	217	-74	824	24	-2
The lifetime of the equipment	-85	-37	552	-21	-15	648	148
Noise	146	254	742	183	193	191	16
Air temperature and weather	635	334	-246	-133	378	-44	126
The level of lighting at the mine site	156	160	819	251	104	84	170
Road conditions, and road slope	324	234	139	305	-81	768	-52
K3 general policy (safety policy)	92	125	162	923	-46	148	54
Health Support	288	340	408	573	49	119	126
Technical instructions for carrying out hazardous work	476	-416	230	97	-170	61	398
Occupational Safety and Health Education / Training	738	74	259	192	129	92	-64
Work standards and rules	-90	-139	-17	222	225	426	452
Quality of leadership and supervisors	181	116	663	126	99	40	134
Quantity of leadership and supervision	-5	75	28	56	84	-36	803

**Figure 3.** Graph of Results of Implementation of Occupational Safety and Health of PT Buana Eltra

mentation of work environment management 65%, implementation of work safety management 57% and work health management 36%. The achievement of the implementation of occupational safety and health in the coal mining company PT Buana Eltra was 57.33%. the factors that influence

**Figure 4.** Scree Plot chart

the implementation of PT Buana Eltra's occupational safety and health are: (1) human factors (use of personal protective equipment), (2) equipment factors (maintenance of machinery and mining equipment, condition of conveyance and production equipment), (3) environmental factors (road conditions and slope). (4) management factors (quality of leadership and supervisors, occupational safety and health organization and standard operating procedures for occupational health and safety occupational safety and health

courses / training).

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1

I D Widodo, N R A Dwinanda. "Job Safety Analysis in Production Floor of PT BD Based on Semi Quantitative AS/NZS4360 Method", IOP Conference Series: Materials Science and Engineering, 2020

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