# Safety And Health Implementation Study Work (K3) In Coal Mining Companies (Case Study: PT. XYZ

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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 lacation.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 AJ) explained that there have been at least 27 incidents in the period 2015 to mid-2019, incidents that occurred, 12 times on the haouling 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
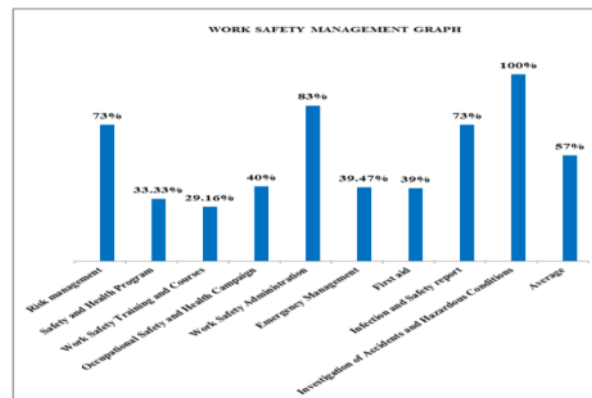


**Figure 2.** Graph of Implementation Results of the Implementation of Work Safety Implementation of PT Buana Eltra

**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 whoused as a means to get information or data that is done in a manner field survey through observation anddirect interviews with respondents incompany. 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 explaided

| No | Initial Eigenvalues | | | All Variance Explained | | | | | |
| | | | | Extraction Sums of Squared Loadings | | | 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 factor.

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

| | Component | | | | | | |
|---|---|---|---|---|---|---|---|
| | 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 |
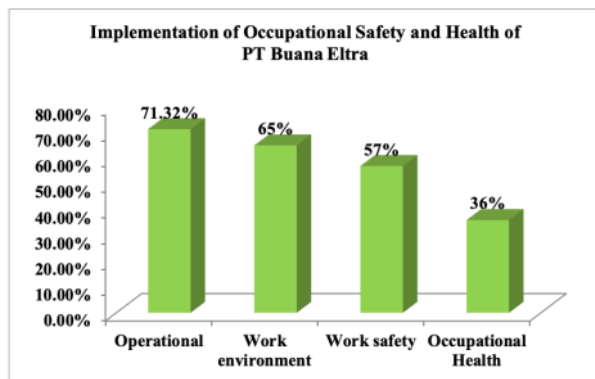


**Figure 3.** Graph of Results of Implementation of Occupational Safety and Health of PT Buana Eltra



**Figure 4.** Scee Plot chart

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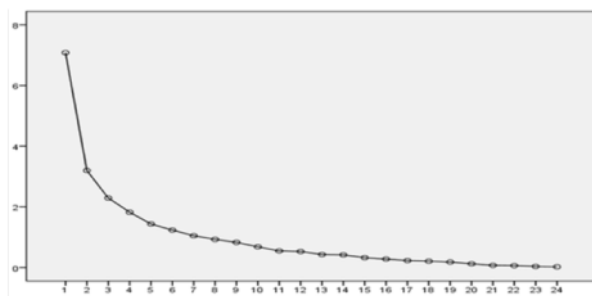 PT Buana Eltra was 57.33%. the factors that influence the implementation of PT Buana Eltra's occupational safety and health are: (1) human factors (use of personal protective equipment), (2) equipment factors (maintenance of machinery and mining equipment, condition of conveyance and production equipment), (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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