Analysis System Occupational Health And Safety in coal Underground

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Abstract. Based on the data obtained from the company, the data of occupational accidents that occurred between the years 2016-2017 there were 10 cases of accidents. The causes of such employees ignore APD, buffering systems which do not conform to the rules, and a ventilation system that is still not good. The purpose of this study were: 1) Uncover Management System Occupational Health and Safety are available on the company today. 2) Uncover buffering system underground mining CV. Karya Maju Sejati 3) Uncover the ventilation system underground mining CV. Karya Maju Sejati 4) Revealing how the protection of electrical equipment in underground mines. 5) Find a solution should be done to reduce the risk of accidents at work in the company and measures of prevention / mitigation of hazards in the workplace . Data collected or obtained directly from respondents by direct observation in the field and interviews with management and staff as well as competent employees of the company and nothing to do with the object of research. The data taken is the danger in the workplace environment, work program K 3 management , implementation and support of ventilation systems and protection of electrical equipment in underground mines.

1. Introduction
One program for the implementation of K3 is Occupational Safety and Health Inspection (K3), where the inspection program aims to identify potential hazards early and strive to reduce the level of risk and danger for workers. The K3 inspection can be done routinely, periodically, or specifically. In the implementation of the K3 inspection program it must be done by someone who already understands and controls the conditions of the field or workplace CV. Karya Maju Sejati already has a Standard Operating Procedure (SOP) for Occupational Safety and Health Management, which in fact in the field there are still many employees who have not complied with the regulations or SOPs that have been made. Based on the author's observations in the field, there are still workers who ignore PPE (Personal Protective Equipment), such as not using safety helmets, and lack of awareness of the consequences of the accident for themselves, the company, and the environment. In addition, the heat of the mine pit and the frequent fall of victims due to gas inhalation confirms that the ventilation system in the CV. Karya Maju Sejati is still not good. Because of the importance of reviewing Occupational Health and Safety (K3) in the mining sector, the government issued a special mine Safety and Health (K3) regulation, namely Minister of Agriculture Decree No. 555K / 26 / MPE / 1995. Thus, the risks to each element involved in mining activities can be minimized.
2. Literature Review

2.1 Occupational Safety and Health Management
Rijal (2009: 2), "Occupational Safety and Health management is intended as a strategy for regulating work processes and procedures, so that work carried out by a worker can provide safety, both physically and non-physically (the environment). Management tasks in general, including implementation planning, control, and so on, also apply to occupational safety and health management.

2.2 Underground Mining.
There are various types of underground mining methods, Open Stope, Supported Stope, longwall, Shortwall, Room and Fillar, Cut and Fill and Geophering.

2.3 Ventilation
General Ventilation Function asically, a ventilation system is an application method of the dynamic fluid principle (in this case air) to the air velocity at underground mine openings. This ventilation system is needed to provide clean air intake for mine workers as well as for mechanical equipment in that location Bambang (2002: 9).

2.4 Buffering.
Buffering is part of an underground mine that is supporting / holding rocks that will collapse.

2.4.1 Wood Support
In accordance with the shape of the arrangement in its installation, the wood buffer is divided into several types: Cribbing, three piece set.

2.4.2 Iron Buffer
the following are the kinds of iron steel supports, namely: I-Beam , This buffer is usually installed for holes that are rectangular in shape and are generally used in the production holes. The buffer is sometimes combined with wood or concrete walls.

3. Research Method

In conducting this research, it combines theory and reality found in the field. From these two things, an approach can be drawn towards solving problems that arise.

3.1. Types of Research
Based on the problems discussed in this study, this research is classified as descriptive research. According to Lufri (2007: 56), descriptive research is research that describes a phenomenon, facts, events or events that are currently or have occurred. This study aims to find out how the program and application of K3 Management in the company, and to know the conditions in the field that have been and can cause accidents and how to overcome them.

3.2. Data Collection Techniques
In carrying out this research, it was combined between theory and field data, so that both of them obtained a problem solving approach. The sequence of research work is:

3.2.1. Literature Study
Literature studies are carried out by searching for supporting literature, both as a basis for research and as supporting and reference related to the quality and mixing of coal.

3.2.2. Field Observation
The purpose of field observations is to make direct observations of the processes that occur and look for supporting information related to the issues to be discussed. Field orientation is done to find out at a glance the field conditions.
3.3 Data collection

Consists of two ways, namely: Primary data retrieval Primary data is data collected or obtained directly from respondents by direct observation in the field and direct interviews with leaders and staff as well as competent company employees and has to do with the object of research. the data taken are hazard conditions in the workplace environment, OHS management work programs, application of ventilation and buffer systems and protection of electrical equipment. Secondary data retrieval, Secondary data is data that is obtained indirectly from the object of research by utilizing existing data such as reports that already exist in the company. The secondary data are work accident report data and employee data.

4. Research Result

4.1. Buffer System

Based on observations that the author did in the field, on buffering where according to SOP CV. Karya Maju Sejati buffer distance should not be more than 1.5 meters, but in reality the buffer distance applied at this time ranges from 2-2.5 meters and is irregular, this causes the buffer system to become unstable, so it can trigger debris. In addition, there are a number of conditions for supporting wood that should have been replaced with new supporting wood but still used

![Broken buffer](image1)

Figure 1. Broken buffer

Ventilation system. Based on the observations made by the author in the field, in terms of ventilation the author realizes that the supply of air is still lacking, this can be seen by workers who are very hot when working in mine pits. ventilation system is not good. One reason is the condition of the pipe or air hose is damaged (torn), so that the air does not flow optimally to where employees work, this results in gas in the mine and the air temperature in the mine increases.

Table 1. Mining Activity Accident Data

| No. | Date           | Location | Tipe Insiden | Nature of injury | Cause                        |
|-----|----------------|----------|--------------|------------------|------------------------------|
| 1.  | 19 February 2016 | Hole 26  | Unsafe act   | Light            | Got hit by a truck           |
| 2.  | 4 June 2016    | Hole 04  | Unsafe act   | Light            | Exposed to coal sparks when extracting coal |
3. 28 September 2016 Hole 30 Unsafe condition Weight Hit the collapsing slope

4. 18 January 2016 Hole 33 Unsafe condition Weight Being crushed by a collapsing roof

5. 4 March 2017 Hole 30 Unsafe condition Weight Breaking the Sling (lorry pulling rope) which causes the employee's hand to be pinched

6. 20 March 2017 Hole 26 Unsafe condition Weight When installing a buffer, the roof suddenly forms napar rock collapses

7. 14 September 2017 Hole 24 Unsafe act Light Sandwiched in a lorry when opening the lorry bar

8. 18 September 2017 Hole 35 Unsafe condition Weight Fall due to a slippery road which causes a broken rib

9. 11 October 2017 Hole 24 Unsafe condition Weight Affected by an ax when carrying out a supporting wedge

10. 14 December 2017 Hole 17 Unsafe act Weight When carrying out coal mining, the coal that was above coal fell on the victim.

4.4 Efforts to Overcome Unsafe Conditions and Unsafe Actions

4.4.1 Mine Occupational Safety and Health Management System.

4.4.1.1 Increased supervision, monitoring is carried out actively and tiered starting from workers in the field to managers so that effective and safe conditions of an activity will be maintained. In addition, cross-supervision is also carried out, because supervisors and workers often occur in certain parts of the world to become accustomed and not aware of any potential danger. Cross-supervision is expected to be able to find things like this and must be corrected immediately.

4.4.1.2 Complete and improve the quality of personal protective equipment. the reason for workers ignoring personal protective equipment is because of the low quality of personal protective equipment. The company should accommodate these complaints by improving the quality of personal protective equipment and completing the number of personal protective equipment in accordance with work conditions where the employee does work and safety devices (vests, gloves, glasses, helmets) so that the workers are comfortable and feel safe with personal protective equipment worn.

4.4.1.3 Make company regulations. based on the Kep Men No.555.K, it is stated that the Head of Mining Inspection must issue at least 12 technical guidelines. In addition, it also makes company regulations or work guidelines and operations in the form of SOP (Standard Operation Procedure) that specifically concern occupational safety and health in accordance with government regulations on this issue. company regulations can be general and specific, general company regulations apply to all existing activities, starting from the mining location, coal hauling road and stock pile. Specific regulations are made for each activity, because each of these activities has different potential hazards, so specific specific regulations must be made.

4.4.1.4 Increase the allocation of funds for work safety activities

4.4.1.5 Conduct coaching or socialization for workers. he efforts that can be made in fostering and socializing the importance of work safety are as follows: 1) Safety talk or counseling conducted by the company and Safety committee

4.5 Safeguards on Electrical Equipment

The lights used in underground coal mines must be Flame Proof so that the air in the lights does not unite with the surrounding air.
4.6 Efforts to Overcome Occupational Diseases

Table 2. Diseases

| No. | Complaints / Types of Disease | cause | Overcoming Efforts |
|-----|------------------------------|-------|--------------------|
| 1.  | Antrakosis                   | Coal dust | Wear masks during work time and reduce work in a place that has a thick intensity of coal dust |
| 2.  | Shortness of breath, dry cough | Coal dust | Wear a mask during work and reduce the intensity of work in a place that has thick coal dust |
| 3.  | Pain and stiffness           | Incorrect work position and bending | Providing talk safety every time before starting work shifts about working positions that are good and right |
| 4.  | Trembling, difficulty sleeping, tight muscles | Noise and vibration | Using ear plug when working and reducing the intensity of the use of tools that produce a long enough vibration |

5. Conclusion
In carrying out activities on the CV. Karya Maju Sejati, there are still unsafe actions and unsafe conditions that have the potential to cause accidents, such as not using PPE, and workers exposed to the impact of axes, and the collapse of slopes, supporting roofs collapsing, and bursts of fire due to methane gas.

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