

## CHAPTER II

### LITERATURE REVIEW

#### A. The Definition of Work Safety

Work safety is the primary means for the prevention of accidents, disabilities and deaths because of work accidents. Good protection of work safety is the gateway for the security of workers. Accidents besides being a direct obstacle can also indirectly damage the machinery, and work equipment. They may also lead to the cessation of the production process for some time, which eventually damages the workplace environment and others. Generally, work safety can be considered as a science, and its application is related to the work equipment, appliances, labor instruments, materials and processing, work conditions and the work environment, and how to perform the work to ensure the safety of workers and the company's assets in order to avoid accidents and other losses.<sup>1</sup>

According to Simanjutak, work safety can be defined as a condition that is free from the risk of accidents or damage. In other words, the risk is relatively very small below a certain level. In every work activity, there is always a potential risk of failures, and when a work accident happens, no matter how small it is, it will result in losses. Therefore, work accidents should be prevented/removed, or at least mitigated, as early as possible. In addition, the problem of work safety in a company should be taken seriously

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<sup>1</sup> Mohammad Adam Jerusalem and Enny Zuhny Khayat, 2010, *Modul Keselamatan dan Kesehatan Kerja*, Yogyakarta, Universitas Negeri Yogyakarta, p. 26

by all components of the business actors and thus cannot be done partially or treated as a marginal subject.

Work safety concerns all production and distribution processes, both goods and services. Work safety concerns the subject or the person doing the work, working tools used to complete the work, both machinery and other equipment, as well as the environment, people and objects. Therefore, it can be said that work safety is from, by, and for every laborer and society in general.

Work safety also includes the provisions of Personal Protective Equipment (APD), engine maintenance, determination of normal work hours, control of losses due to accidents, abilities as well as elimination of unacceptable risks.<sup>2</sup>

Development of industries in Indonesia is getting ahead. However, it is not supported by the awareness to understand and implement work safety in a proper way in order to prevent accidents that often occur in the workplace.<sup>3</sup>

## **B. The Causes of Work Accidents**

A work accident is an unexpected event. Why is it unexpected? It is because there is no intention in such an event, or to be more specific, it is not

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<sup>2</sup> I Gede Widayana and I Gede Wiratmaja, *Op.Cit.*, p. 6

<sup>3</sup> Cecep Dani Sucipto, 2014, *Keselamatan dan Kesehatan Kerja*, Yogyakarta, Gosyen Publishing, p. 75

planned deliberately. Also, the accident is commonly followed by material damage and suffering from the lightest to the heaviest ones.<sup>4</sup>

Generally, the causes of an accident in the workplace are:

1. Fatigue;
2. Environmental aspects and unsafe working conditions;
3. Lack of control over the job of workers, the pre-cause is the lack of training;
4. Characteristics of the work itself.<sup>5</sup>

According to Suma'mur, 80-85% of accidents are caused by negligence (unsafe human acts) and human errors. Accidents and human errors include age, gender, work experience and education. Errors will increase when workers are under stress due to the workload which is not normal or when the working capacity decreases due to exhaustion.<sup>6</sup>

The sources of accident causes can be divided into 2 (two) groups, namely:

a. Immediate Causes

This group consists of two factors, namely:

- 1) Unsafe Acts such as the use of a safety device that is not appropriate or is not working; attitudes and ways of working that are not appropriate; the use of unsafe equipment; and dangerous movements.
- 2) Unsafe Conditions such as the unavailability of safety equipment or ineffective safety equipment, a dirty and messy workplace, improper

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<sup>4</sup> *Ibid*, p. 76

<sup>5</sup> I Gede Widayana and I Gede Wiratmaja, *Op. Cit.*, p. 9

<sup>6</sup> Cecep Dani Sucipto, *Op. Cit*, p. 77

work clothes as well as physical and chemical factors in the work environment which do not qualify.

b. Contributing Causes

- 1) Safety Management Systems such as unclear instructions, violations of the rules, the absence of safety planning, absence of work safety socialization, unidentified danger factors, unavailability of safety devices and others.
- 2) Workers' Mental Conditions such as poor awareness of work safety, the absence of coordination, bad attitudes, slow work pace, lack of attention to safety, unstable emotion, anger and others.
- 3) Workers' Physical Conditions such as frequent seizures, ineligible health conditions, deafness, eye myopia and others.<sup>7</sup>

**C. Principles of Accident Prevention**

1. Heinrich's Domino Theory

Heinrich, an expert in risk assessment from an insurance company in 1993, has observed and studied accident data. The conclusion of his observation is the particular sequence of the accident. If someone is injured then it is usually caused by an accident. Two things cause this accident, namely mechanical hazard or energy resource uncontrolled and unsafe acts. Both of these things happen because of errors, which

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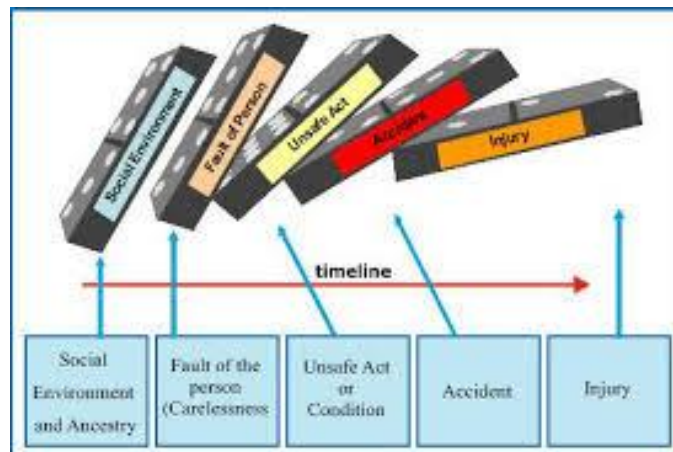
<sup>7</sup> *Ibid*, p. 78

according to Heinrich are caused by either environmental factors or heredity.<sup>8</sup>

Dominoes in Figure.1 illustrate the sequence of the cause (an incident or a situation) that initiates an accident causing injuries or damage. If one of the dominoes fall down, it will hit another domino closest to it and causes it to also fall down. It continues until all the dominoes fall down one after the other, indicating the occurrence of an accident. If one of the dominos (causes) is omitted, for example, we do a measurement of work safety properly, and then there will be no accidents.<sup>9</sup>

**Figure 1**

**Heinrich's Domino Theory**



**Source: Kesehatan dan Keselamatan Kerja 2008**

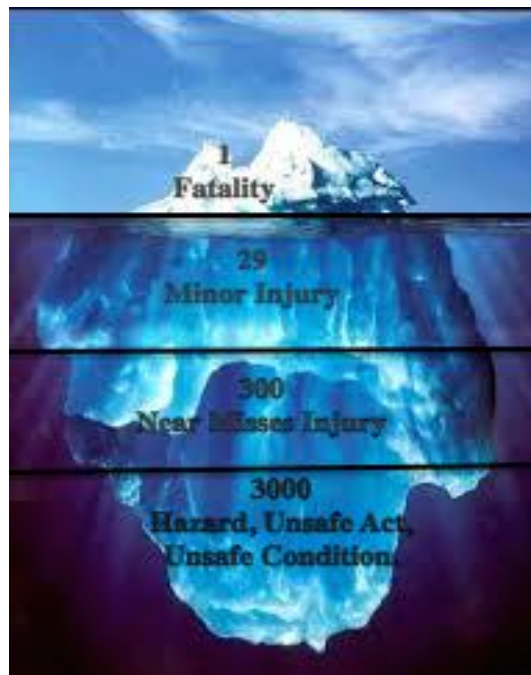
<sup>8</sup> Sajidi Hadiopetro, *Op. Cit.*, p. 31

<sup>9</sup> John Ridley, *Op. Cit.*, p. 114

## 2. The Iceberg Theory

The theory is proposed by Birds and is known as the Iceberg theory. In the workplace, there are always hazards. Hazards are defined as anything potential to cause injury to persons or property damage. Hazards can come from the environment or human behavior. Hazards follow the work pattern, determined by the characteristics of the workplace. Therefore, it can be said that for a certain number of hazards, there will be fatal and serious accidents or only material damage in a certain ratio. The National Safety Council obtain a comparison for every fatality, namely there were 29 cases of Minor Injury, 300 cases of Near Misses Injuries and 3000 Hazards.

**Figure 2**  
**The Iceberg Theory**



Source: Manajemen Komprehensif Keselamatan Kerja 2014

A near miss needs attention because, if it is repeated, there will be a possibility of more serious even fatal consequences. Bricks falling from a height of several tens of centimeters above a worker may only make the workers concerned shocked and stop working for a moment. However, the same event, if repeated, may injure other workers and result in a serious injury. “Today’s laceration may be tomorrow’s amputation”. Nearly infernal must get the same attention as an accident.<sup>10</sup>

### 3. Accident Prevention Efforts

Same as the incidence of accidents, accident prevention is an attempt to eliminate one or more of the causes of an accident. There are lots of ways to avoid, prevent or reduce accidents that occur. These methods are as follows:

- a. Application of regulations, i.e. the provisions that must be met in various ways such as: general business conditions, design, construction, maintenance, supervision, testing, equipment operation, obligations and rights of employers/workers, supervision/health screening and training.
- b. Standard implementation, which consists of the official, semi-official and unofficial standard. As an example: the official standards on safe constructions of a piece of equipment, the semi-

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<sup>10</sup> Sajidi Hadiopoetro, *Op. Cit.*, p. 33

official standard on personal security devices, the standards do not formally appeal a safe and healthy habit.

- c. Supervising, enforcing existing rules, warning or punishing any non-compliance.
- d. Technical research, for example, researching machine guards, trying out various methods, preventing fire and explosion and testing masks for respiratory aids.
- e. Medical research, for example, the physiological and pathological impact of studies on work environment factors.
- f. Psychological research, for example, an investigation of behavior that can cause accidents.
- g. Statistical research, such as research on the types of accidents in an industry.
- h. Education, for example, making the work safety aspects one of the subject matters taught in schools/colleges.
- i. Training, for example, provides work safety instructions to workers who have entered.
- j. Persuasion, for example using print media to encourage the awareness of work safety.
- k. Insurance, for example, providing a special budget for transfer the risk of accidents.
- l. Each worker undertook security measures individually.<sup>11</sup>

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<sup>11</sup> *Ibid*, p. 37



## **D. The Classification of Accidents Based on the International Labor Organization of 1962**

The International Labor Organization of 1962 divides the classification of accidents into 4 (four) groups, namely:

1. The Classification of Accidents by the Types
  - a. Fall
    - b. Struck down by falling objects
    - c. Crushed by objects, except falling objects
2. The Classification of Accidents by the Causes
  - a. Machines
    - 1) Coalmine machines
    - 2) Other machines excluded in the classification
  - b. Conveyances
    - 1) Conveyances
    - 2) Other conveyances
  - c. Equipment
    - 1) Work equipment
    - 2) Stairs
    - 3) Other equipment excluded in the classification
  - d. Materials
    - 1) Dust
    - 2) Hovering objects
    - 3) Other materials excluded in the classification

- e. Work Environment
    - 1) Outside a building
    - 2) Inside a building
    - 3) Inside particular land
  - f. Other causes excluded in the classification
    - 1) Animals
    - 2) Other causes
3. The Classification of Accidents by the Nature of Injuries or Abnormalities
- a. Fracture
  - b. Dislocation/sprain
  - c. Stretch the muscle/tendon
  - d. Bruises and other injuries
  - e. Amputation
  - f. Surface wounds
  - g. Concussion and broken
  - h. Due to weather
  - i. Injured are numerous and different in nature
4. The Classification of Accidents by the Location of the Abnormalities or Injuries in the Body
- a. Head
  - b. Neck
  - c. Body

- d. Upper body
- e. Bottom body
- f. Many places

## **E. Work Safety Management**

Work safety management is a part of the overall management processes and has an important role in the achievement of a company's goals through loss of the company's control. The application of work safety in a company aims to prevent, reduce and mitigate any accident that can cause unexpected losses. An accident may occur due to a number of causes, which among other things is due to humans and equipment. The possible causes of an accident have to be prevented in order that such an accident does not occur since any work can be done safely.

The successful implementation of work safety in a mining industry relies heavily on the management's view on the work safety itself. Safety management is very important to consider, namely:

1. To rescue the laborers from suffering of pain or disability, work loss and loss of financial income.
2. To save the family from the sadness or distress, loss of financial income and the uncertain future.
3. To save the company from loss of laborers, compensation expenses due to accidents, the time lost because of the activity cessation and the declining production from the company.

The basic framework of safety management can be structured as follows:

- a. The main function of management, which includes planning, organizing, implementing, controlling and decision-making related to work safety issues.
- b. The main activities include financial management and reporting, operations, marketing and sales of products as well as communications and information systems. These activities are the goals and objectives to be achieved by the company.
- c. The resources and limitation that include humans, materialism and equipment, consumers demand, economic conditions of the community and the workplace and government regulation can be a part of management activities and management functions.

Based on the basic framework of the safety management, the safety management goal is to prevent accidents or losses of the company, the realization of any management functions in activities is limited by the source or input. The 10 (ten) key for supervision of safety works are:

- 1) The determination of the administration of the work.
- 2) Improving the working methods.
- 3) Correct work placement
- 4) Guidance and supervision in performing their duties.
- 5) Improving safety.
- 6) Maintenance of work environment's requirements.

- 7) Safety Inspection.
- 8) Resolution when problems are found and at the time of the accident.
- 9) Increasing safety awareness.
- 10) Creativity to prevent accidents.

The main target of any company is to reduce the costs to bear resulted from work accidents. Why every company should collate a framework as actions to prevent accidents. The action framework should include:

- a) Supervision of working habits.
- b) Adjustment of the current speed of production with optimum laborers' abilities.
- c) Improving the appropriate mechanisms.
- d) Adjustment of volume production with the time of optimum process.
- e) Establishment of Work Safety committee under a professional Safety Manager.

## **F. Legal Basis of Work Safety**

### **1. Law No. 1 of 1970 on Work Safety**

Law No. 1 of 1970 on Work Safety applies nationally, in the entire territory of the Republic of Indonesia and it is the center of all the safety regulations there under. The Law No. 1 of 1970 did not require corrective/curative properties on work accidents. The accident must be

prevented as determined, so it does not occur in the workplace, as well as increased K3 to taking precedence over prevention.<sup>12</sup>

2. Law No. 13 of 2003 on Labor

Law No. 13 of 2003 on Labor contains an article on work safety, which is stated in Article 86 point 1 “Every worker/laborer has the right to the protection of safety& health of work”.<sup>13</sup>

3. Guidelines for Safety and Health of Work based on the Decree of the Minister of Mines and Energy No. 555.K/26/M.PE/1995 on Safety and Health of Work of General Mining

Some of the Articles regulating works safety are such as;

a. Article 24 of the Decree of the Minister of Mines and Energy No. 555.K/26/M.PE/1995 on Safety and Health of Work of General Mining, the task of Work Safety and Health has the following responsibilities:

- 1) Collecting the data and record the details from every accident or dangerous occurrences, events before the accident, analyzing accidents and accident prevention.
- 2) Collecting the data on the areas and activities requiring closer scrutiny, with a view of giving advice to the Head of Mining Engineering about mining or working procedures, tools,

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<sup>12</sup> *Ibid*, p. 22

<sup>13</sup> Law No. 13 of 2003 on Labor

mining and the use of detection tools and instruments of personal protection.

- 3) Providing information and instructions regarding Work Safety and Health for all mining workers to hold meetings, lectures, discussions, film screenings, publications and so forth.
  - 4) If necessary, establishing and training the members of the mining rescue team.
  - 5) Compiling accident statistics.
  - 6) Evaluating Work Safety and Health.
- b. Article 32 of the Decree of the Minister of Mines and Energy No. 555.K/26/M.PE/1995 on Safety and Health of Work of General Mining, the obligations for miners are;
- 1) The mineworkers must comply with Work Safety and Health regulation.
  - 2) The mineworkers are required to conduct work in accordance with the procedures for safe working.
  - 3) The mining workers during work shall:
    - a) Pay attention or keep the safety of themselves and others who may be affected by their actions.
    - b) Immediately take action or report to supervisors about the circumstances considered capable of posing a danger.

- 4) The mineworkers who see or hear any irregularities execution of the work required to immediately report to the supervisor on duty.
- 5) The mineworkers are compulsory to use and care personal protection equipment in their duties.
- 6) Provide correct information when questioned by the executor of Mine Inspection or the Head of Technical Mining.
- 7) The mineworkers are entitled to declare the work objection to his superiors when the Work Safety and Health requirements are not fulfilled.<sup>14</sup>

4. The Decree of the Minister of Energy and Mineral Resources of the Republic of Indonesia No. 38 of 2014 on Implementation of Safety Management of Mineral and Coal Mining

Article 1 point 2 mentioned "Mining Safeties are all activities that include health and safety management of mining and mining operational safety" and is continued in point 3, stating "Work Safety and Health of mining, hereinafter called mining of K3, are all activities to ensure and protect the miners to survive and stay healthy through the efforts of the

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<sup>14</sup> Guidelines for Safety and Health of Work based on the Decree of the Minister of Mines and Energy No. 555.K/26/M.PE/1995 on Safety and Health of Work of General Mining



management of work safety, work health, work environment, and safety management systems and work health”.<sup>15</sup>

#### **G. Mining Accident Statistics Based on the Decree of the Minister of Mines and Energy No. 555.K/26/M.PE/1995 on Safety and Health of Work of General Mining**

Based on Article 47 of the Decree of the Minister of Mines and Energy No. 555.K/26/M.PE/1995 on Safety and Health of Work of General Mining, mine accident statistic is set every year based on the frequency and severity of accidents that occurred in miners.

Work accident statistic is the statistic caused by or suffered during the work, which results in death. Meanwhile, industrial accident statistics may also include labor accidents during the journey or inside of the company.

##### **1. The Definition of Frequency Rate (FR) and Severity Rate (SR)**

Frequency Rate calculation is useful for any organization because it measures the amount of injury caused by an accident at work compared to total employment. The value is very flexible and can be used to measure various types of accidents in large populations. The Severity Rate is a calculation to determine the severity of an accident. Severity Rate measures the number of days lost due to injury. However, this calculation cannot reveal the severity of chronic injury, such as hearing

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<sup>15</sup> The Decree of the Minister of Energy and Mineral Resources of the Republic of Indonesia No. 38 of 2014 on the Implementation of Safety Management of Mineral and Coal Mining

loss and causes the significant laborers absenteeism due to new symptoms rise for a long time.

The unit calculation for statistic is an accident that happens in company. So, for one laborer suffering from two or more accidents is counted in the number of accidents. Special statistics may also be collected regarding certain types of accidents. Statistics about the same things for different years is very useful for assessing whether such accidents increases and decreases, and how effective or absence of prevention efforts. Accident statistics should be compiled on the basis of the same definition of the accidents in the industry, for the prevention goals in general and as a measure of the risks of accidents in particular. All of the accidents should be reported and tabulated simultaneously, namely:

- a. Figures of frequency and severity of accidents should be collected based on equivalent ways. The restrictions should be queried about the accident, equivalent ways to measure time at risks, and ways to express the amount of the risks.
- b. Industrial classification and work accidents for statistical purposes should always be equal.
- c. Accident classification based on the incidents and the nature and the injury also abnormality and the basics are used to establish the criteria of thought must always be the same.

2. The Calculation of Frequency Rate (FR) and Severity Rate (SR)

Based on Article 47 of the Decree of the Minister of Mines and Energy No. 555.K/26/M.PE/1995 on Safety and Health of Work of General Mining, mine accident statistic, they are:

- a. Mining accident statistics are set every year based on the frequency and severity of accidents that occurred in miners, calculated from:
  - 1) FR is the number of victims of accidents divided by the number of working hours x 1,000,000
  - 2) SR is the number of days lost divided by the number of working hours x 1,000,000
- b. Accident statistics referred to paragraph 1 must be submitted to the Head of Mining Engineering to the Chief Executive Mining Inspection no later than 1 (one) month after the end of each calendar year.

Accident statistics is not solely developed for research toward the prevention of accidents. Although if the purpose of research is the main objective, these statistics are important to explain to all parties concerned on the circumstances of safety, to give warning to potential dangers, to make them aware, and to give enough attention to the accident rate, and sometimes it is necessary to present statistical data, not only in the form of numbers but also in the form of images.

## **H. The Role of Government in Supervising the Implementation of the Provisions on Work Safety for Laborer in Mine Areas of Kutai Kartanegara**

The Office of Manpower and Transmigration of Kutai Kartanegara is the government agency that has an important role in the effort to ensure work safety. In the Regional Regulation of Kutai Kartanegara No. 13 of 2008 on the Organization and Work Procedure of Local Department, Chapter IV on Main Tasks, Functions and Organization, in section five on the Office of Manpower and Transmigration mentioned the main tasks and functions of government agency, namely:

1. Article 16, "the Office of Manpower and Transmigration has the tasks of decentralized authority and deconcentration tasks in the field of manpower and transmigration".
2. Article 17 "In carrying out the tasks referred to in Article 16, the Office of Manpower and Transmigration performs the following functions:
  1. Formulating technical policy areas of manpower and transmigration in accordance with the strategic plan established by the Local Government;
  2. Planning, coaching and controlling the technical policy in the field of manpower and transmigration;
  3. Formulation, planning, coaching and controlling the technical policy of workforce development;

4. Formulation, planning, coaching and controlling the technical policy of labor inspection;
5. Formulation, planning, coaching and controlling the technical policy, the development of industrial relations and social security;
6. Formulation, planning, coaching and controlling the technical policy of transmigration;
7. Implementation of the secretariat affairs;
8. Implementation of Technical Implementation Unit;
9. Coaching the Functional Group.<sup>16</sup>

In addition to preparing and monitoring the implementation of existing regulations, this institution plays a role in disseminating the legislation that already exists. In the regulation, it is also mentioned that the Office of Manpower and Transmigration has the function to provide guidance and supervision to the company in order to create work safety.

#### **I. The Role of Company in Implementing the Provisions on Work Safety for Laborer in Mine Areas of Kutai Kartanegara**

In accordance with the Guidelines for Safety and Health of Work based on the Decree of the Minister of Mines and Energy No. 555.K/26/M.PE/1995 on Safety and Health of Work of General Mining, contained in article 4 point 3, 4 and 5, the obligations of mining employer are:

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<sup>16</sup> Regional Regulation of Kutai Kartanegara No. 13 of 2008 on the Organization and Work Procedure of Local Department in part five of the Manpower and Transmigration

1. Employers must prepare all tools, equipment, personal protective equipment, facilities and costs required for the implementation of this regulation.
2. Employers have to provide free personal protective equipment that is required according to the type, nature and danger of the work he does and for everyone entering the mining business.
3. Based on consideration of the Chief Executive of Mining Inspection, employers have to provide worthy accommodation or close to mining operations for executing Mining Inspection in order to carry out their duties.<sup>17</sup>

Not only to provide a means of equipment, protective devices and others, but the company in this regard should also conduct safety training for the workforce. Work Safety training at the company is very important for both the new and existing workers. The purpose of safety training for new workers is extremely important to understand the missions of the company's objectives and roles in securing, and eventually increasing the production. Therefore, it has to recognize the potential hazards that can cause accidents, and should know how to control. Meanwhile, for workers, the safety training is intended for refreshment of the safety training. It is important because with increasing experience and flying hours, they often assume that workers have a

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<sup>17</sup> Guidelines for Safety and Health of Work based on the Decree of the Minister of Mines and Energy No. 555.K/26/M.PE/1995 on Safety and Health of Work of General Mining

way of working that is more practical and more comfortable by cutting procedures (short-cut) if the methods are in high risk.<sup>18</sup>

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<sup>18</sup> Sajidi Hadiopoetro, *Op. Cit.*, p. 151