Identification of Intervention Program Effectiveness at Work Accident Prevention

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Abstract. Accidents are unexpected events and expected to incur losses. The frequency and severity of accidents can be used as an evaluation in the effort to implement K3 and prevent accidents that have been applied to the plant. This research perform statistical calculations accidents that occur in the company of the year 2013-2016 CPO as an evaluation of the implementation of occupational health and safety techniques that already exist. The results showed that the highest severity rate in 2016 amounted to 103.2581 and the lowest in 2013 with a value of 0. Meanwhile, data on the number of workplace accidents shows that the highest frequency rate was in 2014 with a value of 15.1589 and the lowest was in 2016 with a value of 4.9763. Intervention programs and prevention of occupational accidents in the factory rated yet effective to decrease the frequency and severity of workplace accidents in the company due to increases in the frequency of workplace accidents in 2014 and the increase in the severity of accidents work in 2016.

1. Introduction

Today, almost all manufacturers apply technology in production process to increase productivity. The application of increasingly comprehensive technology to the production process requires companies to pay more attention to workers' health and safety. In doing every job, someone who involved in the job has an accident risk. Accidents are unexpected and expected events resulting in losses. The frequency of accidents occurrence can be evaluated in the effort of K3 implementation and work accident prevention that has been applied by factory.

Previous research has been discussed about work accidents, this can be seen from, work accident caused by excessive alcohol consumption [1]. Workplace accidents can occur in any workplace environment, as is the case with the offshore industry, the research suggests that training is urgently needed that this can lead to communication failures and disturbing elements a significant underlying factor [2]. Even in large companies trying to minimize work accidents, as is done in research that mentions the operator and managers are very necessary. In addition, they explained to make daily decisions so as to better prevent and manage risk [3]. Even through the analysis of other studies mention the imbalance between a person's work capacity and the demands it has to be met by a person, this can lead to fatigue and the occurrence of Burnout Syndrome that causes work accident [4]. Many studies suggested that prevention of occupational accidents is essential to be undertaken, many previous studies have addressed the importance of preventing occupational accidents, some even linking them to work [5]. There are also studies that addressed workplace accidents with the condition...
of interrelated work tools [6]. From the study stated that the prevention of work accident is very important, but the place of this research has not been discussed about the work accident and the prevention.

This company is a manufacturing company engaged in the field of refinery palm oil. The production process is done by using semi-automatic production machines. Ongoing production process using make to order system. In addition, many similar industries require companies to always maintain the quality of products produced to improve the competitiveness of the company. Currently, the company has implemented an intervention program as an effort in preventing and tackling workplace accidents.

This study aims to find out the statistics of occupational accidents that occur in the company as an evaluation in the application of existing health and safety techniques.

2. Methodology
Accidents are unexpected and unfavorable events. Unexpectedly, because behind the event there is no element of deliberate, especially in the form of planning. Work accidents are accidents related to the employment of the company. The employment relationship here can mean that an accident occurs due to the company or at the time of carrying out the work. Classification of occupational accidents according to the International Labor Organization in 1962 is classification by accident type, classification by cause, classification according to nature of injury or abnormality, and classification according to location of abnormalities or injuries in the body.

Accidents are caused by two classes of causes:
1. Unsafety human actions (unsafe human acts),
2. Unsafety environmental circumstances (unsafe condition).

From the investigations, it turns out the human factor in accidents is very important. Always encountered from the results of research, that 80-85% of accidents caused by negligence or human error.

To know the overall view, the number of work accidents from year to year used the size of crash statistics that are generally divided into frequency (Frequency Rate (FR)) and Severity Rate (SR)).

\[
\text{Frequency Rate} = \frac{\text{Jumlah kecelakaan yang terjadi} \times 1.000.000}{\text{Jam kerja orang}}
\]

\[
\text{Severity Rate} = \frac{\text{Jumlah hari yang hilang} \times 1.000.000}{\text{Jam kerja orang}}
\]

Severity Rate (SR) can be calculated based on the number of days lost by accident. Occupational safety and health management basically looks for and discloses operational weaknesses that allow for accidents. This function can be implemented in two ways, namely: to reveal the causes of an accident (root), and to examine whether the control is carefully implemented or not. Accidental operational errors can not be separated from incomplete planning, improper decisions, and miscalculations within the organization, poor management considerations and practices.

3. Result and Discussion
Calculation of frequency of work accident (frequency rate) in PT. Pacific Palmindo Industri in 2013 ie:
Number of employees : 396
Number of work accidents (n) : 9
Number of hours worked per day (h) : 24 jam
The number of days lost due to work accidents (d) : 0
The number of working hours in 2013 : 598.682
Total Human Hours = Working Hours in 2013 – (dxh)
Total Human Hours = 598.682 – (0x24) = 598.682

\[ FR = \frac{\text{Jumlah Kecelakaan yang Terjadi}}{\text{Jumlah Jam Manusia Total}} \times 1.000.000 \] (3)

\[ FR = \frac{g}{598.682} \times 1.000.000 \]

\[ FR = 15,0330 \]

\[ SR = \frac{\text{Jumlah Hari yang Hilang Akibat Kecelakaan Kerja}}{598.682} \times 1.000.000 \] (4)

Recapitulation of frequency rate calculation result - FR and severity rate - SR are as follows:

| Year | Severity Rate – SR | Frequency Rate – FR |
|------|--------------------|---------------------|
| 2013 | 0                  | 15,0330             |
| 2014 | 30,3178            | 15,1589             |
| 2015 | 7,19638            | 8,6357              |
| 2016 | 103,2581           | 4,9763              |

Graphically, the calculation results can be described as follows:

**Figure 1.** Severity Rate – SR, Year of 2013-2016
Based on the picture above, can know that the highest severity rate occurred in 2016 amounted to 103.2581 and the lowest in the year 2013 with a value of 0. Meanwhile, the number of work accident data shows that the highest frequency rate is in 2014 with a value of 15.1589 and the lowest is in 2016 with a value of 4.9763. The number of days lost in PT. Pacific Palmindo Industri is still fluctuating because in 2016 there was 1 worker who lost 1 middle finger joint. The number of accidents that occurred decreased starting in 2015.

As an effort to overcome accidents, K3 management of PT Pacific Palmindo Industri has the following work program:

1. Create SOP (Standardize Operational Procedure) of work permit covering general working permit SOP in hot working environment, SOP of working permit entered in a closed room.
2. Implementing the PPE Procedure, which ensures the full use of PPE for all employees and visitors residing in the PT Pacific Palmindo Industri area in accordance with the safety needs of its work.
3. Installing a visual display of safety warning in every department and work environment that has potential hazards.
4. Give direct warning to workers and visitors who do not use PPE while in PT Pacific Palmindo Industri area.
5. Provide punishment to workers who violate the OSH rules set by the company with a validity period of 6 months.
6. Inspect K3 on project execution.
7. Conducting training for new and permanent workers. Training is done monthly with new material and with participants from each department. This includes simulations for emergencies, such as earthquakes and fires.
8. Provide training for new employees and visitors who will enter PT Pacific Palmindo Industri's area regarding K3 applicable in the factory environment.
9. Create an organization responsible for safety or evacuation for each department.
10. Providing special training held by outsiders (BPSI) to all OSH officers. For example, all K3 officers have a Core Fire Rescue certificate.
11. Inspection Tools Electrical Portable, which is an inspection for dangerous machinery and equipment that must be licensed by the Indonesian government. For example is the feasibility of a boiler engine using.
12. LOTO (Log-Out Tag-Out) Procedure at project time.
13. Conducting housekeeping inspection.
14. Conduction forklift procedure. That is to ensure that all forklift operators have license certificate from the Minister of Manpower.
15. Creating a work permit for all repair activities and activities of contractor workers as a guarantee that the work has been granted permission from the OSH department regarding its safety.
16. Conducting an Incident Investigation Report, which investigates any accidents that occur to be known cause, how to overcome it, and how to prevent it in the future.

The number of accidents that decreased from 2015 indicates that the program of intervention and work accident prevention in PT Pacific Palmindo Industri has been carried out better than the previous
Increasing the severity of work accidents in 2016 occurs due to human factors, or negligence of workers.

4. Conclusion
Based on the identification of intervention and work accident prevention programs in PT Pacific Palmindo Industri, the following conclusions can be drawn:
1. The highest severity rate occurred in 2016 of 103.2581 and the lowest in 2013 with a value of 0.
2. The highest frequency rate is in 2014 with a value of 15.1589 and the lowest is in 2016 with a value of 4.9763.
3. Based on the analysis of frequency rate and severity rate, the performance of accident prevention programs in PT Pacific Palmindo Industri is considered not effective to decrease the frequency and severity of work accidents in the company due to the increase of the frequency of work accidents in 2014 and the increase of the severity of work scarcity Year 2016.

Summary
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