Original Research Article

Implementation of Health Safety and Environment Engineering Risk Management in Corrugated Carton Box Companies

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Abstract

Occupational Health and Safety (OHS) risk management is an effort made to manage the risks of work accidents to minimize the risk of work accidents in a company. The aim and target of OHS risk management is to create an OHS system in the work environment that involves all parties, so as to reduce the number of workplace accidents and create a safe workplace. Therefore, it is necessary to conduct further research on the implementation of the OHS risk management system in the company. In this research, identification and analysis of accident risk have been successfully carried out, as well as making suggestions for risk mitigation in a company in the corrugated carton box sector. In addition, work accident investigations have also been carried out to determine the cause of a work accident and detect latent sources of hazards that were not detected in the risk identification process.
Keywords: Risk Management, Occupational Health and Safety, work accidents, identifications, risk mitigation, hazards.

INTRODUCTION

Occupational Health and Safety (OHS) is a field related to the health and safety of all people in the workplace. The definition of OHS according to OHSAS 18001:2007 is all conditions and factors that can have an impact on the safety and health of workers and other people (contractors, suppliers, visitors and guests) in the workplace (Anon 2007). The implementation of OHS is also one of the most important aspects in the workplace, because it involves the safety of all workers, visitors, and parties related to the company.

Meanwhile Occupational Health and Safety (OHS) risk management is an effort made to manage the risks of work accidents to minimize the risk of work accidents in a company. In Health, Safety, and Environment engineering, the implementation of OHS risk management includes hazard identification, risk analysis, and the establishment of a risk mitigation plan. The aim and target of OHS risk management is to create an OHS system in the work environment that involves all parties, so as to reduce the number of workplace accidents and create a safe workplace. Therefore, it is necessary to conduct further research on the implementation of the OHS risk management system in the company.

RESEARCH METHODOLOGY

The formulation of the problem that has been raised by the author of course requires further research which will then be raised as this research topic. In this study, the authors are interested in conducting further research on PT XYZ in the corrugated carton box industry. Corrugated carton box companies are considered to have quite a lot of risk factors. Therefore, researchers are interested in identifying the risks contained in the company, conducting risk management analysis, and mitigating the risks of existing work accidents.

The research method used is a qualitative research method. According to Farida (Nugrahani 2014), qualitative research methods are types of research that produce findings that cannot be achieved using statistical procedures or other quantitative methods. The qualitative research method was chosen with the aim of developing the concept of sensitivity in a problem at hand, and explaining reality based on theoretical exploration and developing an understanding

of the phenomenon being faced. In qualitative research, there are no certain steps that must be followed. Researchers can make their own steps as needed based on the research to be carried out. However, according to Asep (Suryana n.d.), generally speaking, there are three main parts in qualitative research, namely the preparation/pre-field stage, the fieldwork stage, and the data analysis stage.

The target in this study is the factory and office area at the PT XYZ site. The data collection process is of course carried out with the assistance of the Health, Safety and Environment (HSE) section of the related company. In this study, the population is all people in the PT XYZ area. Then to take as much information as possible in various forms and sources, a sampling process is carried out. The sampling process was carried out using the Purposive Sampling method. Purposive Sampling is a data collection method based on research needs and objectives. This technique is considered capable of capturing the completeness and depth of data in dealing with various realities in the field (Nugrahani 2014).

Sampling was done by interviewing the head of the HSE section and other parties deemed necessary by the researcher. The data used in this study are primary data and secondary data. Primary data is data collected from the results of interviews and observations done by researchers about conditions in the field. Meanwhile, secondary data is data from Hazard Identification Risk Assessment Determining Control. The collection is done by means of interviews, requests for data to the relevant department, and in-depth observations. The data is then collected, analyzed, and then used as the basis for carrying out the next research step.

RESULTS AND ANALYSIS
Risk Identified
There are several risks and sources of danger associated with work accidents that have been identified by the author. Among them are as follows.

1. Noise Hazard
In the factory, there is noise due to the sound produced by the machines in operation. Among them are corrugator machines and flexo machines. This noise is a source of danger that can damage hearing function if the operator/worker is exposed to noise at a certain intensity for a long period of time. Below is a report of the results of noise testing at several sample points at the factory along with noise level standards based on on the regulation of the minister of manpower Number 5 Year 2018.

Table 1 Noise Test Result Report

No	Location	Noise (dBA)		
		MIN	MAX	RESULTS
1	Corrugator 2 Area	90,4	98,5	94,4
2	Flexo 4 Area	91,2	92,9	92,2
3	SMK Factory Side Road	71,1	77,6	74

Table 2: Noise Level Standards

Daily Exposure Time	Noise Internsity (dBA)	Exposure Time	Noise Internsity (dBA)
8 hours	85	28,12 seconds	115
4	88	14,06	118
2	91	7,03	121
1	94	3,52	124
30 minutes	97	1,76	127
15	100	0,88	130
7,5	103	0,44	133
3,75	106	0,22	136
1,88	109	0,11	139
0,94	112		

Based on the table above, it can be seen that workers who carry out their activities in the corrugator area have a maximum exposure time limit of 30 minutes per day. Meanwhile, workers who carry out their activities in the flexo area have a maximum exposure time limit of 1 hour per day. This is certainly not in accordance with the work shift schedule, which is 8 hours per day. Therefore, the company must mitigate the risks posed by these hazards. One of them is by using earplugs, so it can reduce the noise felt by workers and can increase the exposure time limit per day.

2. Hazard due to Lighting
The next hazard that has been identified is the hazard due to lighting. Insufficient lighting can cause visual disturbances. Measurement of lighting levels is carried out in the Flexo area. The measurement results show a lighting level of 722 LUX, which can be said to be pretty well. However, researchers saw that the

majority of lighting sources in the factory came from lighting from outside the factory, such as the sun. Therefore the level of lighting inside the factory may vary, depending on the light source coming from outside the factory. Bad weather conditions can affect the decrease in lighting levels in the factory.

Table 3: Lighting Level Standard

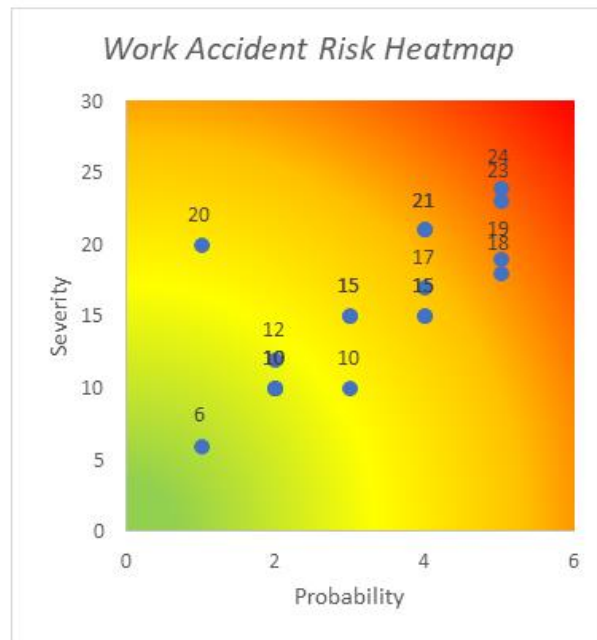| No	Description	Intensitas (LUX)
1	Emergency lighting	5
2	Pages and roads	20
3	The job of distinguishing rough goods	50
4	A job that distinguishes small items in passing	100
5	A rather meticulous work of distinguishing small items	200
6	Careful distinction work than small and delicate items	300
7	Work of distinguishing fine items with medium and long contrast	500-1000
8	Very fine work of distinguishing items with very little contrast for a long time	1000

3. Danger of Slipping

Slipping is one of the sources of danger that has been identified by researchers. A worker who slips can be at risk for minor to serious injury. In addition, injuries suffered by workers can also prevent the workers concerned from doing their jobs. So the company also suffered losses in the form of lost working hours.

Risk Analysis

Based on the results of risk identification that has been carried out, then a risk score is given based on each risk driver. Risk scoring is based on two indicators, the severity indicator and the probability indicator.

No	Risk Driver	Probability (P)	Severity (K)	Risk Level (PXK)
I.1	Feeder unit operation	5	18	90
I.2	Printing unit operation	5	19	95
I.3	Slotter unit operation	5	24	120
I.4	Operation of gluing and folding units	4	15	60
I.5	Operation of the ejector unit	3	15	45
I.6	Tie unit/mosca operation	3	15	45
I.7	Operation of unit load former	4	21	84
I.8	Die cut unit operation	4	21	84
I.9	Stacker unit operation	4	15	60
I.10	Operation of the sample maker	1	5	20
I.11	Shuttle cart machine operation	2	10	20
I.12	Palletizer machine operation	2	10	20
I.13	Ink check	4	17	68
I.14	Production results check	2	12	24
I.15	Forklift Operation	1	6	6
II.1	Machine unit cleaning	3	10	30
II.2	Cutter blower cleaning	5	23	115
III.1	Computer Usage	2	10	20

Based on the indicator data and the level of risk above, the risk priority can be determined based on the risk heatmap of the work accident risk below.

Work Accident Risk Heatmap

The Risk Heatmap above describes the level of urgency of a work accident risk factor for mitigation. There are two indicators that are used to determine a certain level of risk, namely the severity indicator and the probability indicator. In addition to these two indicators, the number of sources of danger that a work process has also influences in determining the risk level score. The red color on the risk heatmap indicates that the risk is important to be mitigated as soon as possible. Meanwhile, the green color on the risk heatmap indicates a lower urgency to mitigate a risk.

Based on the results of the risk analysis above, it can be concluded that the highest risk is in the process of operating the slotter unit. The slotter unit is a unit that functions to cut cardboard according to the desired size and pattern.

Risk Mitigation

After identifying and analyzing risk, the next step is to determine the mitigation steps that can be taken for each activity. There are several risk mitigations that are recommended to be carried out by the company, namely:

1. Ensure properness in machine operation
Associated risks: I.1; I.2; I.3; I.4; I.5; I.6; I.7; I.8; I.9; I.10; I.11; I.12; I.15; II.2

2. Periodically measuring the work climate
Associated risks: I.1; I.2; I.3; I.4; I.5; I.6; I.7; I.8; I.9; I.11; I.12; I.13; I.14; II.2

3. Require the use of PPE in the form of ear plugs and safety shoes
Related risks: All risks related to machine production and preventive maintenance

4. Handling of chemicals according to standards
Associated risks: I.2; I.4; I.13; II.1

5. Installing cable protectors and MCB
Associated risks: III.1

6. Ensure the readiness of work accident prevention facilities
Associated risks: All risks

Accident Investigation

Researchers also conduct an analysis of the causes of accidents that may arise in the future at the related company. The selected accident was an accident caused by being hit by a forklift. Investigation was done based on incident news number X about being hit by forklift. The cause of this accident was the human factor, where the victim walked outside the pedestrian path, daydreaming with a downward glance. In addition, the forklift operator also lost focus, until suddenly he was surprised when he saw that there were pedestrians in his path. The operator honked the horn, but the victim did not have time to dodge, and was eventually hit by a forklift. Then the victim was immediately taken to the company clinic to be given first aid. Then the victim was taken to the nearest hospital for further treatment, because there was a fracture in the back of his right leg.

CONCLUSION

Based on the research that has been done, it can be concluded that:
- Identification and analysis related to the risk of work accidents has been successfully carried out at PT XYZ.
- Risk Mitigation recommendation that can be done by PT XYZ in order to mitigate the risks of work

accidents in PT XYZ's factory has been successfully made.

- Slotter unit operation is the most risky process and needs to be mitigated.
- An investigation of work accidents has been carried out to detect any latent hazard sources that have not been identified in the identification process.

Recommendation

Based on the research that has been done regarding OHS risk management, several suggestions are obtained which are expected to be good inputs for further research.

- Further research is needed on OHS risk management in different industrial fields.
- Quantitative research is needed to calculate mathematically and in more detail the level of risk owned by a company

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