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Analysis of the Effect of Labor on Work Safety, Working Conditions and Work Environment at Sinar Pratama SMEs

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ABSTRACT

Safety is very important for every individual, UKM Sinar Pratama is an UKM that sells various kinds of electrical equipment, such as in the field of lighting and electrical installations. Sinar Pratama UKM has implemented an occupational safety and health program, even though it has implemented several safety standards or procedures in its implementation there are still several potential hazards that can cause work accidents. If the potential hazards that arise can be identified and controlled, then the incidence of accidents can decrease. Identification and control of potential hazards can be carried out using the Job Safety Analysis (JSA) method. This study produces recommendations for improvements in the form of making a Standard Operating Procedure (SOP), as well as the proper use of Personal Protective Equipment (PPE).

Keywords: JSA, HAZOPS, Hazard, Safety.

INTRODUCTION

Whenever, wherever and whoever, intentionally or unintentionally causes the risk of a work accident, it will cause a work accident. From the module "Occupational Safety and Health in the Workplace" (2009), it can be seen that potential hazards to occupational safety and health can occur anywhere and to anyone. Depending on the level of the hazard, the hazard can be fatal or a minor accident.(Ningsih, 2019).

During work, workers face various risks that can cause work accidents. The causes of accidents can be divided into two categories. First of all, unsafe conditions, namely unsafe conditions of machines, equipment, materials, work environment, workflow, nature of work, and work methods. Second, unsafe behavior is behavior that is dangerous for humans that can occur due to lack of knowledge and skills, physical disability, thoroughness and weakness in endurance, as well as poor work attitudes and behavior (Marbun, Puspitasari, 2017).

Some of the obstacles to implementing occupational safety and health (K3) in Indonesian companies include: lack of awareness of workers working according to procedures, lack of work supervision, and identification of potential hazards in the workplace (Gunawan, 2013). In dealing with potential hazards in the workplace, an existing identification method can be used, namely the Job Safety Analysis (JSA) method which can reduce or eliminate potential hazards that can cause work accidents (Jounne, Paul, 2020).

HAZOPS is a systematic safety study, Perform safety assessments and operation of complex equipment based on a systematic approach. The goal is to determine the hazards that may occur in the company's management process, so as to eliminate the main source of the accident (Khamid, Mulyadi, 2018).

UKM Sinar Pratama is a company engaged in the sale of electrical equipment, including lamps,

cables, electronic goods, home electrical installation equipment. Good planning and control in the implementation of the activity process is needed so that all processes can run smoothly so that efficiency and effectiveness in activities can be achieved. So far, SMEs carry out planning and control only based on previous experiences

Danger

Danger refers to any situation or behavior that may cause an accident or personal injury, damage, or other disturbance (Ramli, 2010). Therefore, proper control is needed so that this hazard does not cause adverse effects due to the inherent nature and becomes part of the material, system, condition or equipment. The following are some types of hazards according to the international labor organization (2009) which consist of:

1 Physical danger

Is a hazard in the workplace that has a direct impact on the human physique. Examples of physical hazards include slippery or uneven floor surfaces that can cause slipping or falling, working at heights, fire, working environment temperature, and moving objects.

2 Mechanical hazard

Is a source of danger that comes from tools or equipmentmachine. This hazard is caused by mechanical movements such as the rotation of parts of an engine.

3 Chemical hazard

It is a hazard originating from chemical compounds or elements in the form of solids, liquids or gases. Examples include explosive, radioactive, flammable, and irritant materials.

4 Ergonomic hazards

Is a hazard caused by work design, arrangement of the workplace that is not comfortable for workers so that it can cause fatigue to workers.

5 Electrical hazard

It is a hazard caused by an electrical source. Potential electrical hazards include heat generated by electric energy, and electric fields. This hazard occurs when there is contact with the power source (Adnan, 2020).

Ergonomics

Ergonomics comes from the Greek word ergonwhich means "work" (work), the narrow understanding of work is an activity to earn wages, and the broad understanding is all human movements even though they do not get wages. Nomos which means "law" (natural laws). Ergo (motion/work) that is nomos (natural) is a movement that is effective, efficient, safe, does not cause fatigue and accidents according to the body's ability but gets more optimal work results (Hunusalela, 2020). Ergonomics requires a balance between body capabilities and work tasks. Ergonomics requires the study of systems in which humans, work facilities and their environment interact with each other with the main goal of adapting the work atmosphere to humans. Ergonomics is also known as "Human Factors". The purpose of ergonomics is to increase labor productivity in an institution or organization (Hunusalela, 2020).

Job Safety Analysis (JSA)

Safety analysis is a form of safety management that can reduce the risk of injury or injury to every worker who may be affected by the work. This includes employers, contractors, workers, visitors, and members of the public who may be in close proximity to the workplace. Work must be arranged so that everyone can work safely (Mar'atus Sholicha, 2016). JSA is the systematic identification of potential workplace hazards that can be identified, analyzed and recorded. Work safety analysis is one way to prevent work accidents, namely by establishing and compiling work procedures and train all workers to apply efficient and safe work methods. Developing correct work procedures is one of the advantages of implementing a JSA which includes studying and reporting each step of the job, identifying existing or potential occupational hazards (both health and safety), and determining the best way to reduce and eliminate these hazards. (Mar'atus Sholicha , 2016)

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The Hazard and Operability Study (HAZOPS)

*Hazard*is a condition / condition in a process, tool, machine, material or working method that inherently / naturally can cause personal injury, injury or even death, and cause damage to equipment and the environment. Hazard identification is carried out by the work supervisor or OHS personnel. Hazard identification using standard techniques such as checklist, JSA, JSO, assumptions, hazards, etc. All results of hazard identification must have adequate documents to serve as guidelines in carrying out various activities (Mar'atus Sholicha, 2016).

If all risks in the workplace can be identifiedperfectly, success can be seen. The purpose of hazard identification is to identify various hazards in the workplace so that they can be controlled (Mar'atus Sholicha, 2016).

Hazard Identification with HAZOPS worksheet and Risk Assessment

The steps to identify hazards using the HAZOPS worksheet and Risk Assessment are as follows:

1 Knowing the sequence of processes that exist in the research area.
2 Identify the hazards found in the research area.
3 Complete the criteria in the HAZOPS worksheet in the following order:
   a. Classify the hazard found (source of hazard and frequency of hazard findings).
   b. Describing deviations or deviations that occur during the operation process.
   c. Describe the cause of the deviation (cause).
   d. Describe what can be caused by these deviations (consequences).
   e. Determine the action or temporary actions that can be taken.
   f. Assessing the risks (risk assessment) that arise by defining the criteria for likelihood and consequences (severity). Likelihood criteria (as in Table 1) used is frequency which is calculated quantitatively based on company data or records over a certain period of time. Consequences (severity) criteria used are the consequences that workers will receive which are defined qualitatively and take into account the lost working days (as in Table 2).
   g. Ranking the identified hazards using the HAZOPS worksheet by taking into account likelihood and consequence, then using a risk matrix (as in Figure 1) to determine the priority of the hazard that must be given priority for improvement.
   h. Designing improvements for risks that have an "Extreme" level, then making recommendations for improvements to the process (Bayu Nugroho Pujiono, Ishardita Pambudi Tama, 2010).

Table 1. Likelihood Criteria

Level	Criteria	Qualitative	quantitative
1	Rarely happening	Predictable but not only in extreme circumstances	Less than once per 10 years
2	PossibilitySmall	It hasn't happened yet but it could happen someday	Less than once per 10 years
3	Possible	It should have happened and might have appeared somewhere else	1 time per 5 years to 1 time per year
4	Possibilitybig	It can happen easily	lMore than 1 time per year to 1 time per month
5	Almost Sure	Often occur	More than 1x per month

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Table 2. C*onsequences*(severity)

Level	Description	Injury Rate	quantitative
1	Not significant	Occurrence does not cause harm or injury to humans	Less than once per 10 years
2	Small	Causes minor injuries, small losses and does not cause serious impact on business continuity	Less than once per 10 years
3	Currently	Serious injury and hospitalization, no permanent disability, moderate financial loss	1 time per 5 years to 1 time per year
4	Heavy	Cause serious injury, permanent disability and large financial losses and have a serious impact on business continuity	lMore than 1 time per year to 1 time per month
5	Disaster	Resulting in fatalities and severe losses can even stop	More than 1x per month

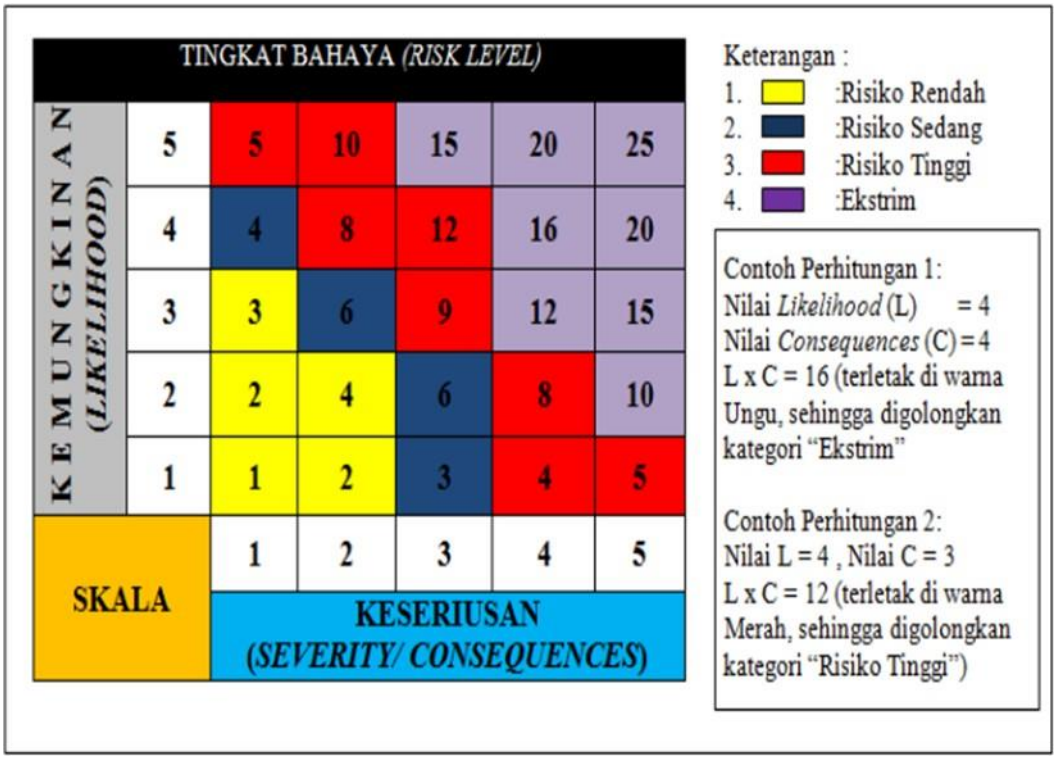

Figure 1. *Risk Matrix*

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METHOD

Activity Plan

This research was conducted using Job Safety Analysis (JSA) and The Hazard and Operability Study (HAZOPS) research methods with the object of research being activities related to occupational safety and health. Data collection methods are observation, interviews, questionnaires and physical measurements.
Based on the problem that has been determined, this is done through a literature study, which aims to solve the problem by searching for previously written materials or browsing various reference books, journals, research report articles and websites on the Internet. After conducting a literature study, the next step is field research, which aims to study and find out how the production process is carried out. Through on-site inspections, I learned that the problem with the workers at the site was a lack of OHS application.

Observation

One of the data collection methods that will be used by researchers in this study is observation. Observations that will be carried out with the owners or workers of SMEs as well as direct observations of the process of their activities. Data obtained from the results of data collection directly from UKM Sinar Pratama. located in Bekasi City.

Interview

The next method that will be used is interview. Interviews were conducted by holding direct question and answer discussions with the owners or workers of Sinar Pratama SMEs in the Bekasi City area.

Work Activity Data

The literature review is carried out by citing theories that have existed in previous studies that can support researchers in conducting research.

RESULTS AND DISCUSSION

In this study, after conducting observations at UKM Sinar Pratama saw that there were workers doing their work in an incorrect way, such as not using complete PPE.

Risk Analysis

After identifying the risk, the risk event is obtained from the actual situation in the field. Therefore, a risk assessment is then carried out with reference to semi-quantitative analysis to obtain the probability, exposure and consequences values. These three factors will be multiplied to get the level of risk. To ensure that the probability, exposure and consequences values are acceptable or not

Table 3. Risk Analysis

No	Hazard identification	*P*	*E*	*C*	*Risk Rating* (R=PxExc)
1	Material fall	3	2	5	30
2	Inhaling material dust	3	10	15	450
3	The fall of the materials	3	0.5	15	225
4	Scratched by sharp material trash	10	10	1	11

5	Falling from a pile of materials	3	2	5	30

Risk Evaluation

Risk evaluation is to assess whether the risk is acceptable or not by comparing it to the applicable risk level standard. Risk evaluation is needed as a basis for controlling hazards and making decisions for the safety system used

Table 4. Risk Evaluation

No	Hazard identification	*Risk Rating* (R=PxExc)	Risk Level
1	Material fall	30	*Priority 3*
2	Inhaling material dust	450	*Very high*
3	The fall of the materials	225	*Priority 3*
4	Scratched by sharp material trash	11	*Substantial*
5	Falling from a pile of materials	30	*Priority 3*

CONCLUSION

By using the Job Safety Analysis (JSA) and The Hazard and Operability Study (HAZOPS) methods, the results of this study will be obtained in the evaluation results showing that the highest risk score in Sinar Pratama SMEs is in inhaling material dust, with a risk level of 450, this highest score categorized as very high, where the score is very high, control must be carried out as soon as possible

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