ISSN No:-2456-2165

The Development of Occupational Safety Observation Program at Pt. Hino Manufacturing Indonesia Using a Website-Based Information System

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Abstract:- This study was conducted at PT. Hino Manufacturing Indonesia in March-May 2021. This research used a mixed methods exploratory sequential design approach. Qualitative research is focused on identifying hazards and assessing occupational safety risks, as well as evaluating the implementation of the work safety observation program currently running at PT. Hino Manufacturing Indonesia. Data collection techniques using interviews, observation, and documentation. Quantitative research aims to test a website-based information system that has been developed based on aspects of functional suitability and usability. This study took 30 samples, with details of 6 employees in each department. Data collection techniques using a questionnaire. The results showed that there are potential hazards in every work process at PT. Hino Manufacturing Indonesia. The potential hazard with the highest risk is the mechanical hazard in the pressing process with risk level IV. The most potential hazards in the welding process, including chemical, physical, and mechanical hazards. The potential hazards in the painting process are chemical hazards, and the potential hazards in the assembly process include physical and psychological hazards.

Keywords:- *Information, Occupational, Safety, System and Website.*

I. INTRODUCTION

Occupational Safety and Health (K3) issues in Indonesia are still often neglected. This is indicated by the high number of work accidents. Based on data from the Indonesian Ministry of Health (2020), the number of work accidents in the last five years has increased. In 2016 there were 101,368 cases of work accidents, in 2017 there were 123,041 cases reported, meanwhile throughout 2018 it reached 173,105 cases. The decline occurred in 2019, which was as many as 114,000 cases and increased again in 2020 to 177,000 cases of work accidents. The work safety observation program that has not been optimal is one of the causes of work accidents (Gunawan, 2013). The work safety observation program is the implementation of Behavior Based Safety (BBS) which aims to achieve zero accidents (Fitriatun, 2019; Hamida et al., 2015; Suryanto, 2015). Companies that have implemented this program have proven to have decreased the number of work accidents by 26% from the previous year (Krause, 1997; Rahmawati et al, 2018).

PT. Hino Manufacturing Indonesia (HMI) is a company that has implemented a work safety observation program since 2018, but in practice there are still several cases of work accidents that occur in the company. It was recorded that in 2018, there were two incidents of work accidents. Work accident cases occurred again in 2019 as many as three incidents. In 2020, there were two accidents at work. The accident was influenced by unsafe action and unsafe conditions. Heinrich (1980) in Irzal (2016) states that 88% of work accidents are caused by unsafe actions, 10% by unsafe conditions, and 2% are unavoidable such as natural disasters.

Work safety observation program at PT. Hino Manufacturing Indonesia is run by using the Completely Check Completely Find Out (CCCF) form once a week. The CCCF form contains the results of observations of hazard identification, risk assessment, countermeasures to be carried out, as well as nearmiss reporting. Based on the results of the preliminary study interview, the work safety observation program at PT. HMI still has many shortcomings. The shortcomings that arise are from the input, process, and output aspects. Weaknesses in the input aspect in the form of not achieving the one man one case target, meaning that there are still employees who do not fill out the CCCF form, some employees also do not fill out the form completely so that it affects the accuracy of the data. The process part has a weakness, namely in data management which is very slow.

This study provides a solution for the development of a work safety observation program at PT. Hino Manufacturing Indonesia. The author will design an information system for the implementation of the work safety observation program. This system is an easy, efficient, and always updated information link. The use of information systems has proven to be more effective than the manual method(Ghaffur, 2017)

The use of a computerized system will provide many advantages. Aspects of data input or recap will be much faster when compared to manual systems. Data storage in a computerized system no longer requires a lot of paper or physical documents to store data, because all data has been stored in a database file. Searching data in a computerized system will be much easier, so there is no need to look at documents one by one which will take up a lot of time. The use of a computerized system also no longer requires a lot of manpower so that companies can make efficiency in the use of labor costs(Rahmawati et al., 2018; Sari et al., 2018).

The development of a work safety observation program using a website-based information system will be the main goal of this research. The implementation of the work safety observation program no longer uses the manual method that takes a long time. With the information system developed, PT. Hino Manufacturing Indonesia can prevent work accidents more effectively and efficiently, so that the zero accident target can be achieved. The website-based information system was chosen because it is easy to develop, maintain, use, and can be used on many hardware devices.

This study aims to develop a work safety observation program at PT. Hino Manufacturing Indonesia by using a website-based information system. Specific objectives include 1) Hazard identification and work safety risk assessment at PT. Hino Manufacturing Indonesia; 2) Evaluation of the work safety observation program that has been running at PT. Hino Manufacturing Indonesia; 3) Designing a website-based information system on the work safety observation program at PT. Hino Manufacturing Indonesia; 4) Testing the developed information system based on the ISO 25010:2011 standard.

II. LITERATURE REVIEW AND HYPOTHESES

A. Hazard Identification, Risk Assessment, and Risk Control (HIRARC)

The HIRARC method is one of the identification, hazard analysis, and risk control techniques used to systematically review processes or operations on a system (Akbar, Indarjo, & Wahyuningsih, 2015). The organization shall establish procedures regarding hazard identification, risk assessment and determining risk control. HIRARC is a key element in the Occupational Health and Safety Management System (SMK3) which is directly related to hazard prevention and control efforts (Irzal, 2016).

Identification is carried out as an initial step to identify what potential hazards exist in a work area. Hazard identification can be done by grouping or classifying potential hazards in order to make it easier to overcome them (Tarwaka, 2015). Hazard or hazard is a source, situation or action that has the potential to injure humans or get sick/disease or a combination of all of them (Atabiq, et al, 2021). Hazard identification is a stage that can provide comprehensive and detailed information about the risks found by explaining the consequences from the mildest to the most severe (Sultan, 2019). This stage must be able to identify foreseeable hazards arising from all activities that have the potential to endanger the health and safety of employees,

B. Work Safety Observation

Observation in language is a careful review or observing something. While work safety is an activity to maintain the work environment so that it is free from potential hazards or events that can injure workers (Irzal, 2016). The work safety observation program is an observation program that aims to prevent and reduce accidents and recognize risky behavior in a workplace (Hill, et al., 2015). The work safety program is one thing that companies can implement as an effort to manage work safety and the environment (ISO 45001, 2018).

The implementation of work safety observation generally uses a card containing a checklist as a medium to make it easier for the observer to determine the category of observation (Pearlman, 2013). Currently, along with technological advances, the card method is being replaced by more cost-effective software applications (Yates, 2015; Luria & Morag, 2011). The aspects of the occupational safety observation category are broadly divided into two, namely unsafe action and unsafe conditions (Bird & Germain, 1990).

C. Nearmiss Reporting

A near miss is one of the categories of accidents that do not cause any injury, damage, or loss (Friend & Kohn, 2007). Nearmiss is also known as 'incident', which is an unwanted event that has the potential to injure humans, cause damage to equipment and stop the process. An example of nearmiss is when a tool falls almost on the worker. Workers are not injured and tools and the environment are not damaged. Nearmiss reporting is an important business for companies to do.

Nearmiss reporting can teach companies how to prevent accidents without having to experience actual accidents (Gnoni & Saleh, 2017). Companies can reduce the frequency of accidents by reducing the number of near miss events. Detailed nearmiss reporting can represent the purpose of a risk management strategy in identifying risks more quickly in small potentials in specific places (Fabiano & Curro, 2012). Nearmiss reporting is one of the things implemented to fulfill the internal reporting aspects of the Occupational Health and Safety Management System (K3).

Companies must implement a nearmiss reporting system to obtain sufficient data to conduct data analysis, correlation studies, trends and performance measurement. Nearmiss reporting is also an opportunity for workers to participate as a basic component in the success of SMK3, besides that it can also create an open culture where everyone can contribute to the safety of themselves and their colleagues. Nearmiss reporting is also one of the company's performance indicators related to safety that is balanced with other safety performance indicators (Fassa, 2020).

D. Behavior Based Safety (BBS)

*Behavior based safety*is a system that companies use to change unsafe employee behavior and attitudes. Straub (2005) in Saodah (2015), behavior based safety educates employees to find the root causes of accident-prone behavior. This is aware of the tendency of employee behavior that causes a high risk of work accidents. Observed behavior is documented and discussed in meetings, so everyone can have a safer environment.

According to Rahardjo (2010) in Tarwaka (2015), BBS is human safety behavior in the work area in identifying hazards and assessing potential risks that arise so that they are acceptable in doing work that interacts with activities, products and services performed. Geller (2001) in Saodah (2015), BBS is an approach process to improve occupational health and environmental safety by helping a group of workers to identify behaviors related to OSH, including:

- Collect worker group data.
- Provide two-way feedback regarding occupational safety and health (K3) behavior.
- Reduce or eliminate system bottlenecks for further development.

E. Work accident

Tarwaka (2015) defines a work accident as an event that is clearly unwanted and often unforeseen which can cause loss of time, property, or property as well as loss of life that occurs in an industrial work process or related to it. Law No. 1 of 1970, a work accident is an unexpected and unwanted event that disrupts the regulated process of an activity and can cause losses, both human and property victims. Work accidents are unexpected and unwanted events caused by a combination of several factors and can cause harm to humans in the form of injury, illness, and even death.

F. Information Systems

A system is defined as a combination of personnel, materials, facilities, and equipment that work together to convert inputs into meaningful and needed outputs (Foster, 2014). The system is a set of elements, entities or components that interact with each other to achieve its goals. O'Brien and Marakas (2010) define a system as a set of interrelated entities, having clear boundaries, working together to achieve goals by receiving inputs and producing outputs in an organized change process. Based on this understanding, the system is a device that has a goal to be achieved through the mechanism of input, process, and output produced by interconnected entities.

Information is a message that has various different meanings depending on the context (Floridi, 2010). Information systems can be defined as mutually integrated components to collect, process, store, and distribute information to support organizations (Laudon, 2012; Veljanoska & Axhiu, 2013). Information systems have a role in supporting operations and business, making decisions and forming superior strategies to face competition (O'Brien & Marakas, 2010). The goal of an information system is to get the right information to the right people at the right time, in the right amount and in the right format.

Information systems can be divided into two, namely manual information systems and computer-based information systems. Computer-based information system is a system of processing data into information using decision-making tools. In theory, information systems do not have to use computers, but in reality information systems cannot be separated from the need for computers, because the use of computers can handle complex information systems. The computer-based information system includes a website-based information system (Al-Badareen, 2011).

G. Website

World Wide Web or websites are pages containing information that are on a hypertext-based world level that allows users to search for various information in the world as long as they are connected to the internet. Sari (2015) website is the entire web page contained in a domain that contains information. A website is usually built on many linked web pages. This website is a place where users can interact directly with information in the form of text, images, video, or sound. There are three types of websites in general, namely (Nugroho, 2012; Wibisono & Susanto, 2015):

- *Website static*

Website static is a website that is formed by typing HTML codes manually into a web page. Static web content is not meant to be edited or updated regularly. An example of this website is a promotional website that is separate from the main website.

- *Website dynamic*

Website Dynamic website is a website that can be updated easily both the content and appearance of the website by the website administrator. This website page is generally divided into two, namely website pages that can be opened by visitors and website pages that can only be opened by website administrators. An example of this page is a news page or blog.

- *Website interactive*

Website Interactive is the development of dynamic websites. This website allows two-way communication between visitors and website administrators or other visitors. Examples are facebook and twitter.

III. METHODS

This research uses a mixed methods approach. Mixed methods research is a procedure for collecting, analyzing, and mixing quantitative and qualitative methods in a study or a series of studies to understand research problems (Creswell, 2015). The type of research conducted in this research is Exploratory Sequential Design, where qualitative research is carried out first and then followed by quantitative research. This research was conducted at PT. Hino Manufacturing Indonesia, which is located in Purwakarta Regency, West Java Province. The time of the research was carried out within seven months, from December 2020 to June 2021. Schedule. The stages of the research are described below.

A. The analysis of Qualitative

This qualitative research used descriptive qualitative research. Descriptive research aims to describe or describe existing phenomena. The selection of research informants used purposive sampling method. Purposive sampling is the most appropriate type of sampling in qualitative research (Bandur, 2019).

The research instrument is a semi-structured interview guide and an observation guide. The interview questions focused on evaluating the work accident observation program currently running at PT. Hino Manufacturing Indonesia. Program evaluation based on aspects of performance, information, economy, and efficiency. Data analysis using Miles and Hubermas in Sugiyono (2012), qualitative data obtained from data reduction, data display and conclusion drawing/verification. Data reduction is the process of selecting, focusing on simplifying, abstracting and transforming rough data that emerges from written notes in the field.

B. The analysis of Quantitative

This quantitative research used descriptive quantitative research. The research design used is a survey research design. Hikmawati (2018) states that the survey research design is research that takes a sample from one population and uses a questionnaire as the main data collection tool. The population in this study were all production employees at PT. Hino Manufacturing Indonesia. The total population is 339 employees. The number of samples in this study were 30 people. The variables in this study are functional suitability and usability.

IV. RESULT

A. Hazard Identification and Work Safety Risk Assessment at PT. Hino Manufacturing Indonesia

PT Hino Manufacturing Indonesia is a manufacturing company engaged in the component assembly industry, assembling buses and trucks, and exporting spare parts. To produce products the size of trucks and buses with various types of materials, workers in factories have direct interaction with machines and other equipment that have potential hazards. These potential hazards can cause work accidents that have a fatal effect on the worker's body and result in losses for the victim and the company. The bus and truck assembly production process includes pressing, welding, painting, and assembly. The production process is carried out in stages so that between one stage and the other stages are interrelated.

Table 1. Matrix of Hazard Identification and Risk Assessment

No.	Work process	Potential OHS Hazards	Risk Level	Impact/Loss	Control Recommendations
1.	*Press*	a. mechanic - Pinched and cut in the hands and feet.	IV (high hazard)	Amputation injuries and death.	*Machinery safe guard* (covering dangerous parts of the machine), using safety shoes, and protective equipment for the neck, arms, and palms.
		b. Ergonomics - The activity of lifting (lifting) steel plates that have been pressed to be moved to the next stage.	III (moderate hazard)	Musculoskeletal disorders and low back pain	Implement work rotation and use modern tools that can automatically carry heavy objects, thereby reducing lifting activities for workers.
2.	*Welding*	a. Chemical - Inhalation of welding fumes and dust.	III (moderate hazard)	Metal fume fever, allergies, asthma, headaches, chest tightness, and coughing.	The ventilation system must be good, namely by using local exhaust. Use respiratory protective PPE.
		b. Physique - Ultraviolet and infrared radiation.	III (moderate hazard)	Skin cancer.	Use an apron & screen to avoid direct radiation contact.
		- Spark.	II (low hazard)	Stinging skin.	Using aprons.
		c. mechanic - Hand injured and cut due to grinding activity.	III (moderate hazard)	Severe injuries and amputations	Use PPE gloves and aprons.
3.	*Painting*	a. Chemical - Inhalation of car paint containing chemicals.	III (moderate hazard)	Lung function disorders	Use safe respiratory system protective equipment.
4.	*assembly*	a. Physique - Dust caused by flying particles left over from the previous process.	II (low hazard)	Allergies, asthma, cough, and chest tightness.	Use respiratory protection.
		b. Psychological - Stress due to monotonous work.	II (low hazard)	Work productivity decreases, work absenteeism increases.	Implement work rotation on the job desk of each worker in the assembly section.

B. Evaluation of work safety observation program at PT. Hino Manufacturing Indonesia

Occupational Health and Safety (K3) Policy PT. Hino Manufacturing Indonesia is committed to becoming a commercial vehicle company (trucks and buses) with a safe, healthy, and environmentally friendly work environment by consistently implementing the Occupational Health and Safety Management system (SMK3) to avoid work accidents and occupational diseases and to support and be actively

involved in improving the implementation of SMK3 to the highest level with continuous improvement.

➢ *Performance Aspect*

The work safety observation program is one of the planning stages in the Occupational Health and Safety Management System (SMK3) which is required in the ISO 45001:2018 standard and PP No. 50 of 2012 related to SMK3. This program is very important to do to know, recognize, and predict the existence of hazards in the work process. In addition to the work safety observation program, PT. Hino Manufacturing Indonesia has also implemented an OHS training program for employees, safety patrol activities, safety culture campaign, procurement of PPE, and a program to check the completeness of motorized vehicles. Work safety observation program at PT. Hino Manufacturing Indonesia has been implemented since 2018. Evaluation based on the performance aspect of the work safety observation program has been going well, but it still takes a long time to process data into a report. The performance aspect is an aspect that focuses on how the process runs and the time it takes in a system.

The work safety observation program requires good cooperation between employees and supervisors. Because in this case it is the employee who fills out the CCCF form, then collects it, and continues with a review by the supervisor. So both employees and supervisors must be careful in filling out and reviewing the CCCF form. Based on the results of interviews, the work safety observation program is easy to run for all employees. The weakness of this program is that it still uses the manual method so that the data processing process takes a long time.

➢ *Information Aspect*

The information aspect is an aspect that focuses on the value of information generated from a system. Information must be in accordance with what is required by the company. Based on the results of interviews, the information obtained from the work safety observation program has met what the company needs. The information generated is about hazard identification, risk assessment, risk control, and near miss reporting. But the quality of the information produced is still lacking, so far it is only limited to quantity.

The work safety observation program always begins with a morning briefing in each department, this is to provide information related to the program to be carried out. Based on observations, it was found that some employees filled out the CCCF form incorrectly, especially in calculating the level of risk. In addition, the hazard control points are sometimes filled with inappropriate controls. Some points are also missed/intentionally not filled in. This makes the supervisor have to re-confirm to the employee concerned so that it takes longer.

➢ *Economic Aspect*

The economic aspect is an aspect that focuses on the costs used in a system. This can be assessed from the balance between the capabilities of a system and the costs incurred. Based on the results of the interviews, each department has its own budget for the implementation of the work safety observation program. The budget includes the procurement of equipment, program implementation, and a repair plan if potential hazards are found. Each department has a budget of IDR 9,000,000 per month for the implementation of the work safety observation program. Based on the results of the interview, the effectiveness of the use of the budget for the work safety observation program is quite good and in accordance with the needs. Every year there is always a draft budget that must be approved by the company manager. The budget document cannot be attached because it is a company secret. Effective use of the budget can be done by minimizing operational costs. So far, operational costs include the procurement of CCCF forms, CCCF boxes, stationery, and equipment for report generation.

➢ *Efficiency Aspect*

The efficiency aspect can be assessed from the comparison between inputs and outputs, how this program can achieve its objectives using limited resources. The implementation of the work safety observation program aims to prevent work accidents and create a safe and healthy work environment. Based on the results of interviews, observations, and documentation studies, it is known that the work safety observation program currently being carried out is still not efficient. This is evidenced by the existence of cases of work accidents that occur in the company. In terms of implementation, filling out incomplete forms also takes work time, for both the reporter and the person in charge of the program, because this time is used to verify unfilled points.

C. Website-Based Information System Design

➢ *System Requirements Analysis*

The needs analysis stage is the initial stage carried out in information system development research, the goal is to determine what things are needed in system development. Based on the results of the interviews, the informants strongly agree with the design of a website-based information system for the implementation of the work safety observation program. The use of information systems can make it easier to fill out CCCF forms, make data processing faster, and secure in terms of data storage. Especially when a near miss occurs, workers can immediately report and follow up so that work accidents can be avoided. The need for an information system for the work safety observation program is prioritized on the ease of filling out CCCF forms, making monthly reports, and later being able to be integrated between employees, supervisors, and the safety as the person in charge of the program. The researcher added unsafe action and unsafe condition points in the CCCF form as an implementation of Behavior Based Safety (BBS) theory.

➢ *Design Stage*

- *Activity chart*

Activity diagrams are made to find out what functions are in a system and who has the right to use these functions. The activity diagram depicts all the actors with their respective scenarios. In this information system there are two

actors, namely employees and supervisors. The following is a diagram of the activity of each user:

- ✓ The supervisor activity diagram is the supervisor activity diagram explaining the supervisor's work flow. The activity starts from the supervisor login, the system will display a dashboard, in the dashboard there are 4 menu options, namely filling out the CCCF form, instructions for filling out the form, a list of collected CCCF forms, and monthly CCCF reports. If the supervisor selects the CCCF form list menu, the system will display a list of the completed CCCF forms, then the supervisor reviews the completed CCCF forms. The system will display a new form for filling out the risk assessment and improvement schedule plan. The supervisor will evaluate the CCCF form whether it is appropriate to be accepted/approved or rejected/rejected.

- ✓ *Employee activity chart*

The employee activity diagram explains the work flow of the employee's employee activities starting from the employee logging in then the system will display the employee dashboard, in the dashboard there are 3 menu options, namely: filling out the CCCF form, instructions for filling out the form, and monthly CCCF reports. The employee selects the CCCF form filling menu, fills out the form and then selects submit. Employees can also view monthly CCCF reports which are divided by category of unsafe action, unsafe condition, incident location, and status.

- *Database Design*

Databases which is used for the website-based information system of the work safety observation program is the H2 database.

- *User Interface Design*

User interface design is a design that relates directly to the user. The user interface design for the information system is divided based on the process, namely the main page or dashboard, filling out the CCCF form, instructions for filling out the CCCF form, a list of collected CCCF forms, and monthly CCCF reports.

D. Information System Testing based on ISO 25010:2011 Standard

Functional suitability testing was tested on 30 respondents using a questionnaire containing the functions of the software. The results of the functional suitability test are as follows:

Table 2. The results of testing aspects of functional suitability

No.	Function	Expected results	Results
1.	*Login*	The function to login to the dashboard page is running correctly	Succeed
2.	*logout*	The function to exit the dashboard page is running correctly	Succeed
3.	CCCF Form Filling	The function to fill out the CCCF form is running correctly	Succeed
4.	Instructions for filling out the CCCF form	The function to display the instructions for filling out the CCCF form is running correctly	Succeed
5.	List of collected CCCF forms	The function to display the list of CCCF forms is running correctly	Succeed
6.	Risk assessment form	The function to fill out the risk assessment form is working properly	Succeed
7.	CCCF monthly report	The function to display reports based on unsafe action, unsafe condition, incident location, and based on status has been running correctly	Succeed

Testing the functional suitability aspect uses the following formula:

$$X = \frac{I}{P}$$

I= Number of features successfully implemented
P= Number of designed features
Calculation of the sub-characteristics is calculated as follows:
Total score x number of respondents = 7 x 30 = 210

Number of features designed x number of respondents = 7 x 30 = 210

$$X = \frac{210}{210} = 1$$

Based on the calculation results, it can be concluded that the information system is declared good and meets the functional suitability aspect. According to the standard ISO 25010:2011 good functionality the X score is close to 1 ($0 \leq X \leq 1$).

Usability testing is carried out to measure the level of satisfaction of using the system that has been built by the user. The benefit of usability testing is that we can find out if the system application development is in accordance with user needs or not, so that it becomes a benchmark for the success of application acceptance by related users. The following are the results of usability testing:

Tabel *Aspect test results* usability

No	Name	SUS Score
1.	Respondent 1	82.5
2.	Respondent 2	82.5
3.	Respondent 3	80
4.	Respondent 4	87.5
5.	Respondent 5	70
6.	Respondent 6	77.5
7.	Respondent 7	75
8.	Respondent 8	75
9.	Respondent 9	75
10.	Respondent 10	70
11.	Respondent 11	72.5
12.	Respondent 12	75
13.	Respondent 13	82.5
14.	Respondent 14	75
15.	Respondent 15	72.5
16.	Respondent 16	77.5
17.	Respondent 17	82.5
18.	Respondent 18	77.5
19.	Respondent 19	82.5
20.	Respondent 20	75
21.	Respondent 21	82.5
22.	Respondent 22	80
23.	Respondent 23	75
24.	Respondent 24	75
25.	Respondent 25	75
26.	Respondent 26	82.5
27.	Respondent 27	82.5
28.	Respondent 28	82.5
29.	Respondent 29	70
30.	Respondent 30	72.5
Total	2325	

Based on the results of the calculation of the SUS score of each respondent, it can be seen that the highest score obtained was 87.5 and the lowest was with a score of 70. While the most frequent score (mode) was 82.5. Henceforth, the SUS score of each respondent is sought for the average score by adding up all scores and dividing by the number of respondents. Here's the formula for calculating the SUS score:

$$\bar{x} = \frac{\sum x}{n}$$

Description:

$\bar{x}$ = average score

x = Total SUS score

n = Number of respondents

the number of respondents' SUS scores in this study was 2325 as shown in the table obtained from 30 respondents. Based on this formula, the average value of the SUS score is obtained as follows:

$$\bar{x} = \frac{2325}{30} = 77.5$$

The SUS score obtained in this study was 77.5, it was included in the acceptable category with a B grade scale

V. DISCUSSION

A. *Hazard Identification and Work Safety Risk Assessment at PT. Hino Manufacturing Indonesia*

➢ *Pressing/Stamping*

The potential hazards in the pressing department are mechanical hazards and ergonomic hazards. Potential mechanical hazards include the presence of limbs being pinched and cut by the press machine. According to the International Labor Organization in Tarwaka (2014), mechanical hazards are included in the category of safety hazards. Occupational safety hazards are types of hazards that can cause injury/injury to death, as well as damage to company property. Some of the machines used in the pressing of PT. Hino Manufacturing Indonesia is a machine that deals with pressure, such as pressing and bending machines. If the worker is not careful in doing the work, the worker's finger or hand can enter the machine and be pinched or even cut.

Based on the results of Nuzuliyah's research (2014), the potential danger of being pinched on roller machines can occur due to pinch points and bite points on roller machines, besides the condition is exacerbated by the lack of security. The use of the machine must be in accordance with the SOP, workers must first read the instructions from the machine before operating it. Daryanto (2008) states that the use of equipment must be correct and receive proper training on its use. In addition, workers must obey all existing regulations and instructions and read the instructions on the machine. This can prevent work accidents as a result of potential mechanical hazards.

Several factors including anthropometric characteristics, nature and severity of physical work, work posture, and lifting/manual handling methods have been associated with the occurrence of low back pain (Priono, 2021). Recommendations for the prevention of ergonomic hazards are to design equipment and work details in accordance with the capabilities of workers, with the aim of preventing injury to workers (Masri, 2021). Meily (2013) stated that ergonomics improvement needs to be done as an effort to prevent disease. In addition, companies can implement modern tools that can automatically carry heavy objects, thereby reducing the lifting activity of workers.

➢ *Welding*

The potential hazards in the welding process are chemical, physical, and mechanical hazards. Chemical hazards are hazards that come from chemicals used in the production process (Masri, 2021). Chemicals used in the production process can cause health problems for workers who are exposed or exposed, from mild effects such as sneezing, itchy skin, to severe effects such as liver and nerve disorders. Viegas, et al (2013) explained that exposure to chemicals is one of the risks that causes the most occupational diseases. Inhalation of welding fumes is the main chemical hazard of the welding process. Smoke is a suspension of small particles in the air that come from the incomplete combustion of a fuel.

Mengkidi's research (2009) suggests that there is a relationship between welding and lung function disorders. It is known that there are 14 workers (37.8%) who experience restrictive welding. To minimize the health impact of the welding process, the company must provide good ventilation, namely by using local exhaust as a means to dispose of the gases resulting from welding to the outside. Workers must also use PPE such as google goggles, masks, gloves, and aprons.

Control efforts that can be done are by using complete PPE. When welding is only for a short time, workers sometimes do not use head protection. According to the Regulation of the Minister of Manpower and Transmigration Number 80 of 2010 concerning Personal Protective Equipment, PPE is used to protect body parts from potential hazards in the workplace. The PPE includes head, eye and face, ear, respiratory, hand and foot protection (Depnakertrans, 2010). The dangers of ultraviolet radiation in the welding process can cause burns, skin and eye damage. The hazard that most affects the workforce when welding is the hazard of radiation (welding radiation) (CCOHS, 2008). The National Safety Council (2002) states that the potential welding hazard that can be caused by the welding process is welding beam radiation. During the welding process, light and light will be emitted which can harm the welder and other workers around the welding area.

The light includes visible light or visible light, ultraviolet light and infrared light. Eye damage due to ultraviolet radiation is called arc-eye, welder's eye or arc flash. The effect does not wear off within a few hours of exposure, so the eyes must be protected with suitable dark glasses. Ridley (2008) states that preventive measures that can be taken to reduce sparks and exposure to ultraviolet radiation are covering exposed parts, using safety glasses (googles), using protective glasses (protective glasses), applying protective cream, and making sure the cover is covered. equipment that emits ultraviolet light is completely locked.

- *Painting*

The main potential hazard in this process is chemical hazard, namely inhalation of chemicals during the process of painting buses and trucks. During painting, there is a potential danger of inhalation of vapors from paint, thinner, and other chemicals used for the painting process. Vapors from the painting process if inhaled can irritate the nose, eyes, and in the long run cause lung damage. Paint particles in painting activities consist of various kinds of hazardous chemicals such as VOCs (volatile organic compounds) which are usually in the form of solvents or thinners, resins, lead, chromium, cadmium, cobalt, mercury, isocyanates and hydrocarbons. These materials are toxic and are carcinogenic materials (Wahyuningsih, 2003).

Based on the results of research from Hudayana (2013), some workers experience dizziness during the process of stirring the composition or dosage of ingredients for the painting process, sometimes coughing due to inhaling chemical vapors during the paint spraying process. One example of an occupational disease caused is rhinitis, which is an inflammatory disease of the nose caused by exposure to substances from the workplace, which can be in the form of dust, smoke, steam or gas and have symptoms that can be mediated either by allergic or non-allergic mechanisms. allergies (Debernardo, 2014).

Control efforts that can be carried out are by providing a special painting room, to minimize the risk of exposure to hazardous materials. Air ventilation in the painting room must also be considered so that fresh air can replace indoor air that has been contaminated by paint dust. Painting activities in an open space (outdoor) even though it allows the supply of clean air automatically, is considered to have a negative impact which results in the spread of paint dust widely, so that people who are in that scope are increasingly at risk. (Fahrudin, 2005).

- *assembly*

The potential hazards in the assembly department include the potential for physical, ergonomic, and psychological hazards. Workers in this process perform one type of work that is repetitive and limited to each product made. In this process, the conveyor carries the painted body buses and trucks along the assembly line, so workers rarely change places of work. This process causes workers to become constant and feels very boring and monotonous. This is what affects the potential for psychological hazards, namely the presence of work stress. The potential physical hazard comes from the dust that is still left from the previous process which can interfere with the worker's respiratory system. Ergonomics hazards result from lifting and repetitive activities.

The results of research by Malard, Chastang, and Niedhammer (2015) show that work stress increased between 2006 and 2010 as well as occupational exposure to psychosocial factors such as high workload, low job control, low peer support, poor relationships, role ambiguity and conflict, and lack of consultation and information on changes. According to Sidabutar and Poerwandari (2003), psychosocial factors can lead to changes in an individual's life, both psychological and social which have a considerable influence as a factor causing physical and psychological disorders in the individual.

Psychological factors are often not realized by workers. There are still not many studies on psychological factors in the workplace. Recommendations that can be given to overcome burnout in workers are by rotating the job desk of workers in the assembly department. Rotation can be done at least every six months so that workers can adjust to their new job desk. Potential physical hazards in the form of dust due to flying particles left over from the previous process that can interfere with workers' respiratory systems. The control recommendation that must be carried out is that workers use masks to protect the respiratory tract from flying dust particles left over from the previous process.

B. Evaluation of the Work Safety Observation Program at PT. Hino Manufacturing Indonesia

➢ *Performance Aspect*

Performance is an aspect that focuses on how the process runs and the time it takes to process a system. The running process can be assessed during the period in which a system is running and response time is assessed from the average time between starting the process until the desired information is produced from a system (Sidiq and Kurniawati, 2019). The results showed that each stage in the work safety observation program was carried out separately. Each of these separate activities has obstacles due to the busyness of each worker. Especially in the data processing section which is only done by one person, so it takes longer. UU no. 13 of 2003 article 87 paragraph 1 concerning manpower states that companies are required to implement SMK3 which is integrated with the company's management system. The work safety observation program is still inconsistent in terms of the timing of providing information. This can be seen from the fluctuating supply of information, ranging from one to three months.

Sutarbi (2005) states that there are two things that can be assessed in terms of performance, namely the time period and system response. The time period is a process that requires data to become information that does not require a long and consistent time, so that to produce an output can be done immediately and scheduled. The system response includes error data, both when entering data, processing it into information, and when providing the information itself.

Poor performance will result in untimely processing and information output, so management cannot make decisions regarding follow-up events quickly and prevent more severe events from occurring (Heni, 2011; Hill, et al., 2015). Therefore, we need a new information system that can summarize system activities so that the time to produce information becomes faster and more consistent.

➢ *Information Aspect*

Information is an aspect that focuses on the value of information generated from a system. The value of the information can be assessed whether the information is in accordance with what is needed, relevant information, consistent information, accurate information, and data management into good and orderly information (Wetherbe and Vitalari, 1994). The information generated from the work safety observation program has been able to meet the company's needs related to hazard identification, risk assessment, risk control, and near miss reporting. The information generated from a system must be accurate, relevant, timely, and sufficient (Fatta, 2007). Accurate means being able to describe according to actual conditions. Relevant is the information obtained is up-to-date information. Being on time is being on time when needed and having consistency. While sufficient means that the information produced is not excessive and not lacking to support the management in making decisions.

One of the important functions that must be considered is data that is easy to process and reclassify (Sutarbi, 2005). Based on these elements, the website-based information system developed has classified unsafe actions and unsafe conditions. The classification system can reduce errors that occur when entering data, processing data into information and presenting information. A computerized information system can create an integrated information system and updated information (Sutarbi, 2005). In addition to speed and accuracy, information from redundant data management can also be minimized by implementing a computer-based information system (Putri and Choiri, 2014). Regarding the information aspect,

It can be concluded that the information aspect of the work safety observation program that has been running so far has met the company's needs, but is still lacking in terms of accuracy and timeliness. The aspect of bad information will have an impact on the accuracy of management in making decisions to follow up. Inaccurate decisions will result in further action being taken that does not solve the problem to prevent the incident from happening again or even worse (Heni, 2011). Therefore, companies need a new computer-based information system with advantages that can solve problems in the information aspect.

➢ *Economic Aspect*

Economics is an aspect that focuses on the costs used in a system. This can be judged from the balance between the capabilities of a system and the costs incurred (Wetherbe and Vitalari, 1994). The cost used in the work safety observation program reaches Rp. 9,000,000 in each department. In contrast to the new system which is completely computerized, although the information system initially requires large costs, in the current period it will save expenses in terms of operational costs because there is no need to procure CCCF forms again. Research by Christi & Erawan (2020) proves that implementing an information system can save costs up to 32% in one year.

The economic aspect contained in the work safety observation program is currently considered to still require a lot of operational costs, so it is necessary to replace the information system that can save operational costs from the program. Saputra's research (2017) has proven that developing an information system can reduce the company's operational costs. Operational costs are costs needed to carry out activities and have consumables in a relatively short period of time, usually less than one year (Ramdhani, 2020).

The implementation of the information system can save the cost of printing CCCF forms, monthly reports, and the cost of purchasing stationery. This operational cost can be reduced by up to IDR 24,000,000 per year for each department. In addition to operational costs, the development of information systems can also save costs for labor. When compared to manual management, the company must incur labor costs to manage it (Saputra, 2017).

➢ *Efficiency Aspect*

Efficiency is an aspect related to the reduction of the energy used to do something, mathematically efficiency can be expressed as the division between output and input. In the context of the system this can be judged by how sufficient information is produced and the time to carry out work and the effort expended can be reduced (Wetherbe and Vitalari, 1994). The current work safety observation program requires a lot of effort, related to time, human resources, costs, and facilities and infrastructure, but the expected results have not been maximized, especially with regard to providing information for decision making by the management. Resources are in the form of CCCF forms, many of which are wasted every time they are procured, because not all of them are used up.

There are also many card collection boxes that have been damaged and are not used, these boxes are only used at the beginning of application. Completing an incomplete CCCF form also takes work time, for both the reporter and the person in charge of the program, because this time is used to reconfirm the variables that are not filled in the form. Time wasted is one of the things that shows the aspect of low efficiency (Wetherbe and Vitalari, 1994). In Sutarbi's research (2005), operational costs such as paper, ink, and labor can be saved with a more effective and efficient information system, faster and more practical performance. Users also do not have obstacles in processing things related to the information generated by the system. Computerized system reduces material wastage, energy, and time and process. Access and updating information becomes faster. A system is said to be inefficient when a lot of time is wasted on resource, tool or computer activities, data is inputted and copied excessively, data is processed excessively, data is produced less or excessively and effort and use of materials is too excessive (Fatta, 2007).

The efficiency aspect of the work safety observation program that is currently running is still far from what is expected, which is that it still requires great effort to get maximum results. This program is also said to be inefficient because there are still work accidents that occur in the company. In 2018, there were two cases of work accidents. Work accidents occurred again in 2019 as many as three incidents, and two cases were recorded in 2020. Based on the evaluation results, work accidents that occurred were caused by failure to find potential hazards in the work environment. But until now, the company is committed to achieving the zero accident target.

C. Website-Based Information System Design

The design of the information system is based on the analysis of system requirements. The work safety observation program has so far been run through a manual process with separate operations, so it requires more energy and time and is prone to errors in each process. The process of the new information system is expected to reduce time and effort and reduce the occurrence of errors. This is because the input, process, and output in the new information system will be implemented in an integrated manner in a website-based application. The expected output of the new information system is the output that can be used by management in decision making, therefore the new information system will provide fast and accurate information and can be accessed anywhere and anytime. The new information system is also expected to improve capabilities in terms of performance, information, economy, and efficiency.

Website-based information systems have two main elements: back-end and front-end. The back-end is a website content management page, and a front-end page for end-users (Kosasi, 2014). The existence of a front end and a back end can simplify and accelerate the development of information systems by separating the business logic on the back-end from the view to the user on the front-end (Soeherman, 2008).

➢ *Login*

The login input design is a form to enter to the page according to the access rights. Access rights are made, one of which is to determine the user's authority, limiting the user according to the authority and type of work. This is done to strengthen the control aspect in computer-based information systems (Raharjo, 1999). Access rights in this new information system are divided into two types of authority, namely employees as submitters and supervisors.

Regular users are users who have access to view account bios, fill out CCCF forms, view the CCCF form filling instructions menu, and view CCCF monthly reports. Supervisor is a user who has access to account biodata, filling out CCCF forms, instructions for filling out CCCF forms, filling out CCCF forms for all accounts, filling out risk assessments and follow-ups, and can view monthly CCCF reports. The login feature is also made to fulfill several important elements of information security, namely confidentiality, authentication, availability access control and non-repudiation (Raharjo, 1999).

➢ *CCCF form filling*

Forms are interfaces used to work with data. Forms can contain command buttons that perform various commands. The form contains an easy-to-use format for working with data and can add functional elements to it (Subroto, 2020). In the developed information system, there is a feature for filling out CCCF forms. The CCCF form is used to report the results of work safety observations and near miss reports. This input design contains fields including the stop six category which consists of 6 categories, namely apparatus, namely the potential for work accidents due to being pinched by the machine, big heavy, namely the potential for work accidents due to hitting a heavy object, car, which is the potential for work accidents due to transportation equipment, drop, namely the potential for work accidents due to falling from a height,

Possible causes of injury are unlikely, probable, high probability, and certain. Check items are tools that have the potential to cause work accidents, the location of the incident, the perpetrators of the incident either themselves or others, the categories of potential hazards, namely unsafe action and unsafe conditions, the type of hazard, description of the incident, description of what is the problem, description of the impact that will occur. , a description of the temporary

countermeasures that may have been carried out, and the option to submit the form.

The CCCF form page has variables created similar to those found on paper/manual forms. The addition of variables only on the type of potential hazard, namely unsafe action and unsafe condition. This has the aim of facilitating user adaptation to new information systems, so as to maximize and increase individual effectiveness when using these devices (Beaudry and Pinsonneault. 2005).

- *Risk assessment form filling*

Risk is the possibility of an accident or loss occurring at a certain time period or a certain operating cycle (Atabiq, 2021; Tarwaka, 2015). According to Sudianto (2020) risk assessment is a process to determine control priorities for the level of risk of accidents or occupational diseases. The purpose of this step is to prioritize further action, because not all aspects of a potential hazard can be acted upon.

Risk assessment in the information system is a task that will be carried out by the supervisor. In this case the supervisor determines the frequency of hazard situations, whether they occur infrequently, frequently, or occasionally. The probability of injury is also determined whether it is certain, highly probable, probable, or even unlikely. Supervisors also determine the level of injury whether it has the potential to cause minor injuries or even death or disability. The final step is to determine the level of risk from the potential hazard. Is it a risk level I, II, III, or IV.

- *Instructions for filling out the CCCF form*

Instructions for use or user manual is a document that contains a collection of instructions or instructions on how to install, use, or repair hardware or software products (Lam, 2006). This user manual is very important to show the user that the application meets the user's needs. The value of the application can be reduced if the functions provided are not fully usable by its users. In this case, the user manual has an important role in adding value to the application itself, namely to convey to its users so that users can carry out all application functions optimally (Fortunela, 2012).

In the website-based information system developed, there are instructions for filling out the CCCF form. Instructions for filling out the CCCF form are written based on documentation from PT. Hino Manufacturing Indonesia (2008). Instructions are written systematically and structured so that they can be useful for users. This is in accordance with Eriksson's (2008) statement which states that the user manual must be written in a systematic, structured, complete, and clear manner.

- *CCCF monthly report draft*

Report or reports are used to summarize and present the data that is in the database. Reports are capable of presenting complex data, so users can understand reports quickly and easily. A good report is able to present what is right and wrong, so that report users can make decisions from the results of the report (Subroto, 2020). The report design is made to display report information to workers and supervisors which contains summary reports within a certain time span in the form of graphs. In this design there is a function to filter information so that it can make it easier for users to sort out the information needed (Sutarbi, 2005). It aims to improve the information aspects and efficiency of the new information system (Wetherbe and Vitalari, 1994). Summaries are needed for higher management levels, to help managers understand the contents of the report (Sukoco, 2007). This is in accordance with the role of information systems as supporting business operations and processes, making decisions, and forming superior strategies to face competition (O'Brien and Marakas, 2010).

D. Information System Testing Based on ISO 25010:2011 Standard

- *Testing aspects of functional suitability*

Testing the functional suitability aspect based on the ISO 25010:2011 standard is used to assess the extent to which a product or system provides functions that meet needs under certain conditions. The test was conducted on 30 respondents. 30 respondents stated that of the seven functions that were successfully designed, the seven features were successfully implemented. Obtained a value of X = 1 which means that all the features developed on the system can run well. The functional suitability test got a result of X=1 categorized as "Very Eligible" (ISO 25010, 2011; Feoh & Wiryadikara, 2019). Functional suitability seeks to find errors in system functions, interface errors, errors in data structures, behavior or performance errors, initialization errors and system shutdowns. Information system testing on the functional suitability aspect is also intended to see the quality of the system. The quality of the system leads to an increase in the use of information systems and if the quality of the system has an influence on system users, it will generate the interest of system users to frequently perform the system operation process (Mudiono et al, 2018).

Functional suitability testing uses black-box testing. Black-box testing is a test that focuses on the functional specifications of the software, the tester can define a collection of input conditions and perform tests on the program's functional specifications (Hidayat & Putri, 2019). Black-box testing is done by using the checklist method in the test case that contains the functions of the information system. The goal is to ensure that there are no errors in the program, and if an error is found, it can be corrected immediately (Agarwal, Taual, & Gupta, 2010). Functional suitability testing uses the black-box testing method by testing seven functions of the developed website-based information system. Seven functions tested include login, logout, CCCF form filling, CCCF form filling instructions, list of collected CCCF forms, risk assessment forms, and CCCF monthly reports. Overall, the functions of the information system can run smoothly without any traffic jams or errors.

- *Usability aspect testing*

Usability aspect testing based on ISO 25010:2011 standard is used to assess the extent to which a product can be used by users to achieve goals effectively and efficiently.

The results of usability measurements in this study will be the first step in evaluating the website being developed. The test was conducted on 30 respondents through the System Usability Scale (SUS) questionnaire. The SUS score can indicate the level of user acceptance of the developed information system. Acceptability determination and grade scale are used to see the extent of the user's perspective on the information system device. The results of the study showed that the respondent's SUS score was 77.5. The score is in the acceptable category and in grade scale B. In accordance with previous research, The SUS score must be worth more than 70 to be included in the Acceptable category or can be accepted by users (Brook, 2013; Bangor, et al, 2009). This shows that the developed information system can be accepted by users. User acceptance will affect the decision to return to visit the website (Marcus, 2002).

In addition, if a system has been included in the acceptable category, it also illustrates that the user interface in the system is easy to use (Nielsen, 2012). A well-designed user interface can increase the easy and natural interaction between the user and the system (Stone et al., 2005). This is in line with the research of Tan and Wei (2006), which states that a good user interface will increase user satisfaction. A poorly designed user interface will lead to frustration and dissatisfaction, and consume 40% of repeat user visits (Stone et al., 2005; Marcus, 2002). This study uses SUS because it has been proven valid and reliable. In accordance with the research of Sauro (2011) and the research of Tullis and Stetson (2004), which shows that the System Usability Scale (SUS) is a valid and reliable usability testing tool. Until now, SUS is widely used to measure usability and shows several advantages, including: SUS can be used easily, because the results are in the form of a score of 0–100 (Brooke, 1986); SUS is very easy to use, does not require complicated calculations (Bangor, et al, 2009); SUS is available free of charge, does not require additional costs (Garcia, 2013); SUS proved to be valid and reliable, even with a small sample size (Tullis and Stetson, 2004; Brook, 2013). does not require complicated calculations (Bangor, et al, 2009); SUS is available free of charge, does not require additional costs (Garcia, 2013); SUS proved to be valid and reliable, even with a small sample size (Tullis and Stetson, 2004; Brook, 2013). does not require complicated calculations (Bangor, et al, 2009); SUS is available free of charge, does not require additional costs (Garcia, 2013); SUS proved to be valid and reliable, even with a small sample size (Tullis and Stetson, 2004; Brook, 2013).

VI. CONCLUSIONS AND SUGGESTIONS

Based on the results of research and discussion, conclusions were obtained, including 1) There are potential hazards in every production process at PT Hino Manufacturing Indonesia. The potential hazard with the highest risk is the mechanical hazard in the pressing process with risk level IV. The most potential hazards are in the welding process, including chemical, physical, and mechanical hazards. The potential hazards in the painting process are chemical hazards, and the potential hazards in the assembly process include physical and psychological hazards; 2) Evaluation of work safety observation program at PT. Hino Manufacturing Indonesia based on the performance aspect has been going well, but it still takes a long time to process data into a report. Based on the information aspect, the program has fulfilled what the company needs. Based on the economic aspect, the effectiveness of the use of the budget for the program is quite good and in accordance with the needs. The efficiency aspect has not yet been achieved because there are still work accidents that occur in the company; 3) The design of a website-based information system for the work safety observation program is made with two main users, namely employees and supervisors. There are four main features in the developed information system, namely features for filling out CCCF forms, features for filling out CCCF forms, features for viewing a list of CCCF forms that have been collected, and features for viewing monthly CCCF reports and 4) Testing information systems using the ISO 25010 standard. :2011 on functional suitability and usability aspects. The test results on the functional suitability aspect show that all functions in the system are running well with a value of X=1 and are in the very suitable category for use. The test results on the usability aspect obtained a respondent's SUS score of 77.5 including the acceptable category and in the B grade scale.

Based on the conclusions above, the suggestions that can be given are a) For companies consisting of PT. HMI can improve internet access in all departments to maximize the function of the developed information system., PT. HMI is advised to carry out engineering control in the pressing department, namely by providing machine guarding in each press machine, providing adequate local exhaust in the welding and painting departments, applying job desk rotation in the assembly department to prevent potential psychological hazards and being more routine to carry out administrative control, in the form of periodic machine checks in each department and complete safety signs. B) For workers, workers at PT. HMI should carry out work in accordance with the applicable Standard Operating Procedure (SOP), Complete Personal Protective Equipment (PPE) in the work environment and use rest periods properly, so that when doing work they can be more focused and concentrated; 3) for further researchers, the website-based information system in this study was only carried out until the first stage of the trial. Further research can be continued until the implementation and maintenance stages so that it can be seen whether there are positive changes in the new information system. Further research can also develop existing features in information systems. The development of features can be tailored to the needs of the company and based on the theory of Occupational Safety and Health (K3), an example is the addition of features for the OHS hazard category. so that when doing work can be more focused and concentrated; 3) for further researchers, the website-based information system in this study was only carried out until the first stage of the trial. Further research can be continued until the implementation and maintenance stages so that it can be seen whether there are positive changes in the new information system.

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REFERENCES

[1]. Al-Badareen. 2011. Software Quality Models: A Comparative Study. *International Conference on Software Engineering and Computer Systems* (ICSECS): 46 - 55.

[2]. Atabiq, F., M. P. E. Wahyono., Diono., Q. Fitriyah., Ridwan. 2021. *Keselamatan dan Kesehatan Kerja*. Bandung: CV. Media Sains Indonesia.

[3]. Bangor, Aaron, K, Philip., dan M. James. 2009. Determining what individual SUS scores mean: Adding an adjective rating scale. *Journal of usability studies*. 4(3): 114-123.

[4]. Beaudry. A., dan Pinsonneault. 2005. Understanding User Responses to Information Technology: a Coping Model of User Adaptation. *MISQ*. 2(9): 493-524.

[5]. Bird, E. F. dan L. G. Germain. 1990. *Practical Loss Control Leadership*. Georgia: Loganvile.

[6]. Brooke, J. 1986. SUS-A quick and dirty usability scale. *Usability evaluation in industry*. 189(194): 4-7.

[7]. Brooke, J. 2013. SUS: a retrospective. *Journal of Usability Studi*es. 8(2): 29-40.

[8]. Christi, N. dan Erawan, P. 2020. Perancangan dan Implementasi Sistem Informasi Berbasis Teknologi pada UKM dan Implikasinya Terhadap Pengurangan Biaya Persediaan: Studi Kasus UKM X. *Journal Manners*. 3(2): 103-121.

[9]. Creswell, J. W. 2015. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Los Angeles: Sage Publication.

[10]. Daryanto. 2008. *Keselamatan kerja bengkel otomotif*. Jakarta: Bumi aksara.

[11]. Debernardo, R. 2011. Occupational Rhinitis. Occupational Airways. Dapat diakses di: http://www.ct.gov/dph/lib/dph/environmental_health/eoha.

[12]. Depnakertrans. 2010. Peraturan Menteri Tenaga Kerja dan Transmigrasi RI Nomor PER.08/MEN/VII/2010 Tentang Alat Pelindung Diri. Jakarta: Depnakertrans.

[13]. Fabiano, B., dan F. Curro. 2012. Form a Survey on Accidents in the Downstream Oil Industry to the Development of a Detailed Nearmiss Reporting System. *Process Safety and Environmental Protection*, 90, 357-367.

[14]. Fassa, F. 2020. *Pengantar Keselamatan dan Kesehatan Kerja Konstruksi*. Jakarta: Podomoro University Press.

[15]. Fatta, H. A. 2007. *Analisis dan Perancangan Sistem Informasi untuk Keunggulan Bersaing Perusahaan dan Organisasi Modern*. Yogyakarta: Penerbit Andi.

[16]. Feoh, G., dan Wiryadikara. 2019. Pengujian Functional Suitability pada Implementasi Pembelajaran Aksara Bali Berbasis Augmented Reality. Sintesa prosiding 2019. 2013-212.

[17]. Fitriatun, E. 2019. Evaluasi Penerapan Program My Bbs Berdasarkan Unsafe Act Di Pe Bagging Dan Warehouse Pt. Chandra Asri Petrochemical, Tbk. *Journal of Chemical Information and Modeling*. 53(9): 1689–1699.

[18]. Floridi. 2010. *Information - A Very Short Introduction*. Oxford: Oxford University Press.

[19]. Fortunela, O. 2012. Pembuatan User Manual Berdasarkan IEEE Std 1063- 2001 – Studi Kasus pada Aplikasi Slims+ (Sistem Layanan Informasi Manajemen Sekolah Plus). *Jurnal Teknik POMITS*. 1(1): 1-7.

[20]. Foster. 2014. *Software Engineering, a Methodical Approach*. New York: Apress.

[21]. Friend, M. A., dan J. P. Kohn. 2007. *Fundamentals of Occupational Safety and Health*. United Kingdom: Government Institute.

[22]. Garcia, A. 2013. UX Research|Standardized Usability Questionnaires. Diakses pada 19 Mei 2021. http://chaione.com/ux-researchstandardizing-usability-questionnaires/.

[23]. Ghaffur, T. A. 2017. Analisis Kualitas Sistem Informasi Kegiatan Sekolah Berbasis Mobile Web Di Smk Negeri 2 Yogyakarta. *Elinvo (Electronics, Informatics, and Vocational Education)*. 2(1): 94–101.

[24]. Gnoni, M. G., dan Saleh. 2017. Near-miss Management Systems and Observability-In-Depth: Handling Safety Incidents and Accident Precursors in Light of Safety Principles. *Journal Safety Science*, 91, 154–167.

[25]. Gunawan, F.A. 2013. *Safety Leadership Kepemimpinan Keselamatan Kerja*. Jakarta: Dian Rakyat.

[26]. Hamida, L. N., A. Subekti., dan W. Arninputranto. 2015. Perancangan Sistem Informasi Pendukung Pelaksanaan Checklist K3 pada Equipment Granulator.

Proceeding 2 Nd Conference On Safety Engineering, 2(2581): 127–130.
[27]. Hasibuan, A. 2020. Teknik Keselamatan dan Kesehatan Kerja. Medan: Yayasan Kita Menulis.
[28]. Hasibuan, A., Purba., Marzuki., E. Sianturi. 2020. *Teknik Keselamatan dan Kesehatan Kerja.* Medan: Yayasan Kita Menulis.
[29]. Heinrich, H. W., Petersen, dan N. Roos. 1980. Industrial Accident Prevention 5 th Ed. McGraw-Hill, New York.
[30]. Hendry. 2015. *Aplikasi 4 In 1 VB dan MySQL*. Jakarta: Grasindo.
[31]. Heni, Y. 2011. *Improving Our Safety Culture.* Jakarta: PT. Gramedia Pustaka Utama.
[32]. Hidayat, T., dan Putri. 2019. Pengujian Portal Mahasiswa pada Sistem Informasi Akademik (SINA) menggunakan Black Box Testing dengan Metode Equivalence Partitioning dan Boundary Value Analysis. *Jurnal Teknik Informatika.* 7(1), 83–92.
[33]. Hill, R. H., Pastor., Cagle., dan G. B. Carlin. 2015. Management Safety Observations-a Tool to Maintain a Strong Safety Culture. *Journal of the Cork Historical & Archaeological Society*, 7(8): 1-5.
[34]. Hudayana. 2013. Identifikasi Risiko Bahaya Keselamatan dan Kesehatan Kerja (K3) Pada Pekerja Meubel UD. Mita Furniture Kalinyamatan Jepara Tahun 2013. *Jurnal Kesehatan Visikes.* 13(1); 22-29.
[35]. Irzal. 2016. *Dasar-dasar Kesehatan dan Keselamatan Kerja.* Jakarata: Kencana.
[36]. ISO 25010. 2011. *ISO 25010:2011 Software Process: Improvement and Practice*. Switzerland: ISO Organization.
[37]. ISO 45001. 2018. *Occupational Health and Safety ISO 45001*. https://www.iso.org/files/live/sites/isoorg/files/store/en/PUB100427.pdf.
[38]. Krause, T.R. 1997. *The Behavior-Based Safety Process: Managing Involvement for an Injury Free Culture*. United State of America: John Wiley & Sons.
[39]. Lam, C. 2006. Applying the Spatial-Contiguity Effect to Software Manuals. International Professional Communication Conference. Chicago: IEEE Conference Publications.
[40]. Laudon, K. C. dan P. L. Jane. 2012. *Management System: Managing the Digital Firm Twelfth Edition*. New Jersey: Prentice Hall.
[41]. Luria, G. dan Morag. 2011. Safety Management by Walking Around (SMBWA): a Safety Intervention Program Based on Both Peer and Manager Participation. *Journal of Accident Analysis and Prevention*, 4(5), 248-260.
[42]. Malard, L., Chastang., dan Niedhammer. 2015. Changes in psychosocial work factors in the French working population between 2006 and 2010." *International Archieves of Occupational and Envirotmental Health*. 88(2), 235-246. doi: 10.1007/s00420-014-0953-6.
[43]. Marcus, A. 2002. *Return on investment for usable user-interface design: Examples and statistics*. Aaron Marcus and Associates, Inc. Whitepaper.
[44]. Masri, R. M. 2021. *Rekayasa Lingkungan.* Yogyakarta: Deepublish.
[45]. Meily Kurniawidjaja., dkk. (2013). Pengendalian Risiko Ergonomi Kasus Low Back Pain pada Perawat di Rumah Sakit. MKB, 46(4), 225-233.
[46]. Mengkidi, D. 2010. Gangguan Fungi Paru dan Faktor-faktor yang Mempengaruhinya pada Karyawan PT Semen Tonasa Pangkep Sulawesi Selatan. Tesis Magister Kesehatan Lingkungan Program Pascasarjana Universitas Diponegoro. Available from. http://eprints.undip.ac.id http://eprints.undip.ac.id/15485/1/Dorce_Mengkidi.pdf .
[47]. Mudiono, D.R.P., Hernawati, S., dan Bukhori, S. 2018. Dampak Kualitas Sistem, Pengguna Sistem dan Organisasi dalam Pemanfaatan Kinerja Sistem Informasi Manajemen Rumah Sakit di RSU Dr. H. Koesnadi Bondowoso. *Multidisciplinary Journal.* 1(1): 25-29.
[48]. Nielsen, J. 2012. Usability 101: Introduction to Usability. Diakses 19 Mei 2021. http://www.nngroup.Com/ articles/usability-101-introduction-tousability/.
[49]. Nugroho, P. I. dan R. Ferdiana. 2015. Pengujian Usability Website Menggunakan System Usability Scale, *Jurnal Ilmu Pengetahuan & Teknologi Informasi*, 17(1): 31.
[50]. Nuzuliyah, N. 2014. Analisis Bahaya Pekerjaan Bagian Paper Machine Berdasarkan Metode Job Safety Analysis (JSA) Dalam Upaya Pengendalian Bahaya. *Artikel Ilmiah Hasil Penelitian Mahasiswa.* Universitas Jember.
[51]. O'Brien dan Marakas. 2010. *Management System Information.* New York: McGraw Hill.
[52]. Priono, N. J. 2021. *70 Materi Safety Talks*. Yogyakarta: Deepublish.
[53]. Raharjo, B. 1999. *Keamanan Sistem Informasi Berbasis Internet.* Bandung: PT. Insan Komunikasi Indonesia.
[54]. Rahmawati, C. I., I. Santiasih., dan W. Wiediartini. 2018. Analisis Efektifitas Program Behavior Based Safety dan Faktor-faktor yang Mempengaruhi pada Pekerjaan Welding. *Seminar MASTER PPNS*. *3*(1): 197–200.
[55]. Ramdhani, D. 2020. *Akuntansi Biaya: (Konsep dan Implementasi di Industri Manufaktur).* Yogyakarta: CV Markumi.
[56]. Ridley, J. 2008. *Ikhtisar Kesehatan dan Keselamatan Kerja Edisi Ketiga*. Jakarta: Erlangga.
[57]. Saodah, S. 2015. Penerapan Program Behavior Based Safety (BBS) dan Kecelakaan Kerja di PT. Inalum Kuala Tanjung Tahun 2014. *Jurnal Universitas Sumatera Utara* 2(1): 22-28.
[58]. Saputra, R.T. 2017. Pengembangan Sistem Informasi Secara Insourcing dan Outsourcing. Tesis. Bogor: Manajemen dan Bisnis Institut Pertanian Bogor.
[59]. Sari, R. 2015. Sistem informasi akademik berbasis web pada SD Negeri 29 Jakarta. *Jurnal Sistem Informasi STMIK Antar Bangsa*. 4(2): 1-12.
[60]. Sauro, J. 2011. Measuring Usability with the System Usability Scale (SUS). Tersedia: https://measuringu.com/sus/

[61]. Sidabutar, D. I., dan Poerwandari. 2003. *Pemulihan Psikososial Berbasis Komunitas: Pengalaman Kerja di Indonesia*. Jakarta: Pulih dan Kontras.
[62]. Sidiq, A., dan Kurniawati. 2019. Analisis Kebutuhan Sistem Administrasi Bagian Sidang Ujian Universitas Gunadarma dengan Metode Pieces. *Jurnal Ilmiah Teknologi dan Rekayasa*, 24(1). 22-34.
[63]. Soeherman, B. 2008. *Designing Information System*. Jakarta: Elexmedia.
[64]. Subroto, B. 2020. *Back-End SQL Server Express dan Front-End Access: Membuat Aplikasi Dokumen Elektronik Sederhana*. Jakarta: Erlangga.
[65]. Sudianto., I. Svinarky., Zulkifli., dan A. M. B. Ithnin. 2020. *Sistem Manajemen K3.* Batam: CV. Batam Publisher.
[66]. Sugiyono. 2012. *Metode Penelitian Kuantitatif, Kualitatif, dan R&D.* Bandung: Alfabeta.
[67]. Sukoco, B.M. 2007. *Manajemen Administrasi Perkantoran Modern.* Jakarta: Erlangga.
[68]. Sultan, M. 2019. *Kecelakaan Kerja; Mengapa Masih Terjadi di Tempat Kerja.* Ponorogo: Uwais Inspirasi Indonesia.
[69]. Suryanto. 2015. Evaluasi Implementasi Kartu Observasi Bahaya. *Jurnal Universitas Muhammadiyah Semarang*. 10(2): 54–63.
[70]. Sutarbi, T., 2005. Analisis Sistem Informasi. Yogyakarta: Andi.
[71]. Tan, G.W., dan Kwok, K.W. 2007. An empirical study of Web browsing behaviour: Towards an effective Website design. *Electronic Commerce Research and Applications.* 5(4): 261-271.
[72]. Tarwaka. 2015. *Ergonomi Industri: "Dasar-dasar Pengetahuan Ergonomi dan Aplikasi di Tempat Kerja*". Surakarta: Harapan Press.
[73]. Tersiana, A. 2018. *Metode Penelitian.* Yogyakarta: Start Up.
[74]. Tullis, T.S, dan J.N Stetson. 2004. A Comparison of Questionnaires for Assessing Website Usability. *Usability Professional Association Conference*. 1–12.
[75]. Veljanoska, F. dan Axhiu. 2013. Information Systems as Support to Corporate Management. *Journal Management Information Systems*. 8(4): 3-9.
[76]. Viegas, S., Faisca., Dias., Clerigo., E. Carolino., dan C. Viegas. 2013. Occupational Exposure to Poultry Dust and Effects on the Respiratory System in Workers. *Journal of Toxicology and Environmental Health*. 7(6), 230–239.
[77]. Wahyuningsih, F. Y., 2003. Dampak Inhalasi Cat Semprot Terhadap Kesehatan Paru. *Cermin Kedokteran*. 13(8):12-7.
[78]. Wetherbe, J. C., dan Vitalari. 1994. *Systems Analysis and Design: Best Practices.* United States: West Publishing Company.
[79]. Winarsunu, T. 2008. *Psikologi Keselamatan Kerja.* Malang: Universitas Muhammadiyah Malang Press.
[80]. Wiryosumarto, O. 2014. *Teknologi Pengelasan Logam*. Jakarta: PT Pradnya Paramitha.
[81]. Yates, W. D. 2015. *Safety Professional's Reference and Study Guide.* Florida: Taylor & Francis Group.