Analysis of RBS Chrome's Employee Preparedness Conditions Against Fire Threats

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Abstract. Fire is an event where a fire is not where it should be, resulting in material or life losses and can occur anywhere. Fatal fires are those that occur in the industrial sector because they will disrupt operational and production activities. The purpose of this study is to analyse employee preparedness for facilities or infrastructure from the protection system in RBS CHROME and find out the comparison of the preparedness of production employees and management employees to fire hazards in RBS CHROME. This type of research is descriptive quantitative. The design of this study used a list of questions as a guideline for interviews and field observations. The list of questions to informants of the study was carried out on 3 groups of employees, namely production employees and management employees of RBS CHROME. Field observation of facilities or infrastructure using a checklist sheet that refers to a ministerial regulation. The results of this study show that RBS CHROME has provided facilities or facilities for fire disaster preparedness, but employees who are in the RBS CHROME office do not understand and are not prepared for fire disasters

Keywords: Fire Preparedness, Fire Protection System, Fire Threat.

1. Introduction

Disasters are extraordinary events in which the resources, personal or material in the area around the disaster are unable to control these extraordinary events that can threaten people's lives caused by natural factors, non-natural factors, or human factors that cause human casualties, environmental damage, property losses, and psychologic impacts (Nurjanah R, 2019). Currently, the industrial sector has developed rapidly, especially in the fields of science and technology. Changes in people's mindsets and lifestyles starting from only relying on natural resources around them, are currently moving to use tools made by humans themselves with greater energy consumption. The knowledge factor of people who do not really understand about the potential dangers of these fuels can further increase the potential for fires to occur.

Developments in the increasingly advanced industrial sector have a positive impact on the progress of prosperity and the nation's economy also has potential dangers that can cause fires, work accidents, and environmental pollution. The use of energy such as electricity, chemicals or other fuels such as the use of hydrocarbon elements in the hardchrome industry which causes a higher potential for fire hazards. The factor of insufficient employee knowledge about the potential dangers of energy such as electricity and chemicals can further increase the potential for fire hazards. According to PERMENAKER No. 03 / MEN / 1998, a work accident is an unintended and unexpected event or occurs suddenly that can cause losses in the form of life, funds or property. Therefore, efforts are needed to prevent and overcome fire-related needs to exist in the work environment, especially industry.

Fires in industry are one of the events that can not only cause loss of property and life, but will also affect the running of operational activities so that stability and continuity will be disrupted and industrial activities experience financial losses borne by the company. RBS CHOME itself is a company engaged in the hardchrome metal coating industry and nickel chrome so that it is anti-corrosion / rust, anti-scuffing, and heat resistant on certain surfaces. In the production process, RBS CHROME uses machines that require high-voltage electric power. The production process also uses chemicals as the basic material for coating hardchrome and nickel chrome. Plus there are sources of electricity or other hazards that are easy to cause fire or as a trigger for a fire.

In 2012 in America, the number of fires was still relatively high at 1,375,000 fire cases, resulting in 2,855 deaths, 16,500 injuries and property losses of approximately $12,400,000 (National Fire Protection Association, 2013). It is necessary to see the suitability of the fire protection system with applicable regulations, including PERMEN PU No. 26 / PRT / M / 2008, KEPMEN PU No. 10 / KPTS / 2000, PERMENAKER No. 04 / MEN / 1980, SNI, and NFPA. If it has been implemented correctly and in accordance with existing safety standards, the magnitude of fire cases will be easier to handle and minimize. Therefore, we find an important problem that exists in RBS CHROME, namely about how to implement and the current conditions of employee preparedness for fire hazards in RBS CHROME. As a resident of Sidoarjo, researchers feel concerned and interested in the problems that occur in RBS CHROME, an analysis of employee preparedness for fire hazards in RBS CHROME is needed.

2. Literature Review

According to research (Yulianti, 2018) states fires can be caused from natural phenomena such as climate, weather, lightning and volcanic eruptions that have the potential to cause fires. Basically, the causes of fires are divided into two, namely due to human activities and natural phenomena. Human activities or commonly referred to as *human error* that occur due to human carelessness, for example, such as leaving a bonfire that is still burning, electrical short circuits, or throwing cigarette nipples carelessly.

According to (Rodriguez, 2007) there are 3 types of losses due to fire, namely Direct Losses, Indirect Losses, and Losses that are Difficult to Estimate. Direct losses are losses in the form of money or materials that can be estimated by comparing conditions at the time when there was no disaster. Indirect Losses such as evacuation costs, salaries and others. Losses That Are Difficult to estimate are losses that cannot be taken into account.

According to researchers (Ramadhani, 2020) explained the steps that can be taken in the event of a fire disaster, including not panicking, because panic will make you lose self-concentration and result in carelessness in the evacuation process. Evacuation routes or plans of places that we know can lose memory instantly at a time when we panic. Protect the Respiratory Tract, when the fire flash point is positioned close enough to us, then immediately protect the nose and mouth using a cloth,

tissue, wet wipes, handkerchief or you can use the top you are wearing. Inhalation of fire smoke can result in loss of consciousness leading to death. Follow the Evacuation Instructions, follow the directions of the evacuation route attached to the walls of the workshop.

Law no. 24 of 2007 states, preparedness is a series of activities carried out in the form of efforts to anticipate disasters through organizing through appropriate and effective scarcity. (Ministry of Health, 2005). Fire preparedness is an effort carried out to anticipate fire disasters so that when a fire disaster occurs, they can take appropriate and effective actions (Rahayu, 2009). The purpose of preparedness is to minimize or reduce side effects due to fire hazards with appropriate, adequate, efficient, effective and emergency response precautions for disaster relief (Martanto, 2017). The following are the factors that are able to influence employee preparedness in the face of fire disasters according to (Patuju, 2018) namely as follows:

1. Simulation and socialization training in fire disaster management
2. Supporting protection system as an effort to prepare an *early warning* system instrument
3. Preparation of contingency plans.

3.   Research Methods

The method used in this study is descriptive-quantitative. This research is an observational type of research that aims to analyze fire protection systems as an effort to mitigate fire disasters in RBS CHROME. The object of this study is the fire protection system in the metal plating industry Ria Berkat Sejahtera Chrome (RBS CHROME) which consists of an active fire protection system. As well as identifying comparisons of fire disaster preparedness from production employees and management employees at RBS CHROME. The respondents in this study were production employees and management employees at RBS CHROME totaling 38 people, namely 19 production employees and 19 management employees. The selection of respondents is based on different places or positions regarding the magnitude of the mains voltage in the work environment and the range of evacuation routes to the rescue facility

This research was conducted at the RBS CHROME workshop starting from April 2021 to February 2022 with data collection in May 2022. This research is field research with *a cross-sectional* research design because observations are made at one time. To identify comparisons of fire preparedness for disasters from production employees and management employees at RBS CHROME using a reference from the number of samples in this study was 38 respondents. The instrument used is a questionnaire of protection systems, knowledge and preparedness attitudes made by researchers themselves by modifying a questionnaire from Ahmad Saifulloh on the Relationship of Knowledge and Attitudes with Fire Preparedness in Employees at the Copyright Building of the Ministry of Transportation in 2018 (Ahmad, 2018). This questionnaire has been tested for validity with a calculated r value (0.406-0.648) > 0.329, and a reliability value of 0.744.

As for employee preparedness for facilities or infrastructure from the protection system in RBS CHROME , the conformity level assessment is based on National Standards, namely Permenaker No.Per.02 / Men / 1983, Kepmen PU No.10 / KPTS / 2000 and Permenaker No.Per 04 / Men / 1980 using the level of fire audit assessment according to the Puslitbang Permukiman in 2005.

Table 1. Fire audit assessment level
Source: Puslitbang Permukiman Tahun (2005)

Value	Compatibility	Reliability
>80-100	As per requirements	Good (B)
60-80	Installed but there is a small part that does not meet the requirements	Simply (C)
<60	Not appropriate at all	Less (K)

The data that has been collected is then processed descriptively, namely describing the object under study by comparing the suitability based on THE PU Regulation No.26 / PRT / M / 2008 NFPA then presented in the form of tables and narratives so as to facilitate the reading of the results of the research carried out.

4.   Results and Discussion

Employee preparedness for facilities or infrastructure from the protection system in RBS CHROME
The active fire protection system in the RBS CHROME office building consists of a fire alarm, detector, sprinkler, fire extinguisher and hydrant. All such elements are identified by observation.

Table 2. Active Fire Protection System Conformity Level in RBS CHROME

No	Component	Presented
1.	Alarm	80%
2.	Detector	75%
3.	Sprinkle	0%
4.	Appear	80%
5.	Hydrant	65%
	Degree of conformity	**60%**

Fire alarms are of conformity level compared to the standards of Permenaker No.Per.02/Men/1983, Kepmen PU No.10/KPTS/2000 and Permenaker No.Per 04/Men/1980. Based on the results of observations showing an alarm suitability rate of 80%, the placement of alarms is placed on each floor so that building users can easily hear the sound of the alarm, besides that the predetermined positions are clearly visible and not blocked by other objects which means Good. There are as many as 2 pieces, each such alarm is located on the wall close to the door.

The detectors in the RBS CHROME workshop building are 4 pieces. All of these detectors are routinely checked at the beginning of each month since they were first installed by technicians because they include a maintanance agenda or monthly routine checks. The detector is very important to detect the presence of heat, in the event of a fire the detector can detect the presence of fire through the sound of an alarm so that the fire is quickly overcome. According to (Kurniawan, 2014) states that the detector system has a fairly good fulfillment level which means it is installed but there is a small part of the installation that is not in accordance with the requirements of Permenaker No.Per.02 / MEN / 1983.

Fire sprinklers have a degree of conformity compared to the standards of Permenaker No.Per.02/Men/1983, Kepmen PU No.10/KPTS/2000 and Permenaker No.Per 04/Men/198. Based on the observation results, it shows an alarm suitability rate of 0%, meaning that there is no fire sprinkle installed in the RBS CHROME workshop. Sprinkle is not connected with the alarm system because there is no sprinkler.

Light fire extinguishers have a degree of suitability compared to PERMENAKER No. 04/MEN/1980 and PERMEN PU No. 26/PRT/M/2008. Based on the results of observations, it shows that there are 3 light fire extinguishers in the RBS CHROME workshop with the type of *dry chemical powder*. Each fire extinguisher is pressed at the end of the floor close to the stairs totaling 1 piece. According to the observations, the placement of the fire extinguisher is equalized on each floor so that building users can easily remember the position of the fire extinguisher, besides that the predetermined positions are clearly visible and not blocked by other objects.

The hydrant level of conformity is compared to the standards of PERMENAKER No. 04 / MEN / 1980 and PERMEN PU No. 26 / PRT / M / 2008 hiidran the observation results consist of chrome room hydrants and hydrants in the polishing machine area. The 1st floor hydrants are located inside the chrome room totaling 1 piece, while the hydrants in the polishing machine area are in the polishing machine area. Testing the function of the hydrant is carried out once every 1 month on a regular basis.

The available hydrant boxes are easy to open, view, and reach. The hydrant box is painted red with the words hydrant painted in white. However, in the box there are no good and correct instructions for using the hydrant so it cannot be used quickly at any time. We recommend that the hydrant box be paid more attention to make it easy for the operation of the hydrant. The hydrants in RBS CHROME are pressurized an average of 8 bar at all locations. Observation results based on the table of the degree of conformity of the protection system active fires showed 65% with less categories, meaning that elements were installed but most were not in compliance with applicable standards.

Comparison of the preparedness of production employees and management employees to fire hazards in RBS CHROME
1.   Level of Understanding of Evacuation Routes and The Use and Location of Fire Protection Systems

Employee preparedness is divided into three, namely the level of understanding of evacuation routes and the use and location of fire protection systems, facilities and infrastructure (disaster warning systems) and preparedness (emergency plans) between employees in RBS Chrome. RBS CHROME employees consist of 38 people, 19 production employees and 19 management employees. The number of questionnaire questions for understanding evacuation routes and the use and location of fire protection systems consists of 5 questions for each employee.

Table 3. Employee Understanding Test

	Employee Understanding
Mann-Whitney U	175.500
Asymp. Sig. (2-tailed)	.882
Exact Sig. [2*(1-tailed Sig.)]	.885[b]

Based on the results of the man whitney proportion test in the table, it is obtained if the value of Asymp. Sig. (2-tailed) of 0.882 is greater than > probability of 0.05. Therefore, as the basis for the man-whitney test decision-making above, it can be concluded that H1(rejected) is thus found that the majority or most of the employees do not understand the evacuation route and do not know the use and location of the fire protection system in RBS Chrome.

Reviewing the results of the answers from the questionnaire given to respondents, the majority of employees, both production and management employees, still do not understand the understanding of evacuation routes and the use and location of fire protection systems which include knowledge and attitudes in appropriate self-rescue actions when a fire occurs.

2.   Employee Preparedness Level for Facilities or Infrastructure from the Protection System in RBS Chrome

The number of questions for the facilities and infrastructure questionnaire (disaster warning system) consists of 2 questions for each employee. The results were obtained from the tabulation of the questionnaire that had been analyzed using SPSS with the Anova One way formula.

Table 4. Test the Anova Facility one way

Facilities	Employee	Mean	Itself
	Production Employees	14.74	0,817
	Management Employees	14.21	

In the table above, the difference in the level of employee preparedness for facilities or infrastructure is presented on average between production employees and management employees with exposure to production employees having an average of 14.74 while management employees have an average of 14.21. So descriptively it can be concluded that the average employee preparedness is the highest, namely production employees. The results of the one-way anova test are known to be sig at 0.817> 0.05, so it can be concluded that the average population of the two employees does not differ significantly.

Looking at the results of the questionnaire answers given to respondents where the population of the two employees did not differ significantly in the level of preparedness of the facilities or infrastructure of the protection system in RBS Chrome in self-rescue as well as the response and completeness needed before a fire.

5.   Conclusions and Suggestions

Conclusion

Based on the results carried out in the research and discussion presented, it can be concluded that the fire protection system in the RBS CHROME workshop is included in the sufficient category (C) WHICH IS 60%, Items that are not suitable are sprinkles. In the result of the man whitney proportion test states that the value of Asymp. Sig. (2-tailed) of 0.882 is greater than < probability of 0.05. Therefore, based on the decision making the man-whitney test concluded that H1(rejected) and it can be stated that most employees do not understand the evacuation route and do not know the use and location of the fire protection system in RBS Chrome. The one-way anova test showed a sig result of 0.817> 0.05, so it was concluded that the average of the two employee populations did not have a significant difference. Knowing the result of the one-way sig anova test is 0.895 > 0.05, so it can be concluded that the average of the two employees has no significant difference.

Suggestion

From the research conducted, there are several suggestions that are recommended, including equipping the facilities and facilities of the fire protection system with standards and provisions set by regulations. We recommend that RBS CHROME add a sprinkler system that has a network and clean water supply that is free of mud and sand, the sprinkler head is in good condition not blocked by other objects, automatically connected to the fire alarm, the distance between sprinklers is not more than 4.6 conducting inspections and trials at least once every 1 year. We recommend that periodic inspections or inspections be carried out, which is once every 1 month for the workplace environment, especially in the RBS CHROME warehouse. Collaborating with external parties to carry out simulated fire emergencies and make training to increase knowledge and provide certificates as a sign if employees have disaster mitigation capabilities in a fire hazard. Provide a *reward* system for employees who obey the rules regarding fire hazards to be a positive example / reference for other employees.

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