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The Risk Assessment of Occupational Safety Using Job Safety analysis (JSA) at PT. P&P Lembah Karet Padang

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Abstract

Occupational accident has been a big problem for most of industry in the developing countries. This research aimed to know the condition of occupational risk level at PT. P&P Lembah Karet Padang. This research was conducted in the sections that have large number of occupational accident and repeatedly occured. The primary data were obtained from observations, while secondary data were obtained from the archive of the factory. The analysis method was Job Safety analysis (JSA) which consisted of hazard identification, risk assessment and risk control recommendation. The result of this research was presented in figures and tables which described that there were still high risk in Timbang Section, Gilingan Section and Press section, shown by red color code. There were still some medium and low risk too, shown by yellow and green color code. Based on the result, it can be concluded that there were still high risk and medium risk in some sections of PT. P&P Lembah Karet Padang, that could not been controlled yet, which caused occupational accident that occurred time aftertime. It is suggested to the factory to apply the recommended risk contol in order to decrease or remove the same occupational accidents that may happens in the future.

Keywords: Job Safety Analysis (JSA), Occupational Safety, Occupational Accident, Risk Assessment

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1. Introduction

Indonesia is a developing country that has been doing improvements and development. The development programs in Indonesia have brought rapid progress in all areas, namely industry sector, services, proportion, mining, transportation and others. But, behind every positive progress, there is always the negative impact. Disaster like accidents, pollution and occupational diseases have happened and made thousands of people injured every year. This condition is caused by lack of adequate risk management, and lack of concern about the implementation of Occupational Safety and Occupational Health (K3). The development progress has not been followed by the

increase in awareness of company related to hygiene and occupational health. So the hazards and risks keep increasing [1].

Occupational accidents are every unplanned, uncontrolled and undesired events occurring due to work or at workplace. Occupational accidents and Occupational illness had killed and took more victims than world wars. A research conducted by the International Labor Organization (ILO) in 2003 concluded that an average of 6.000 people died every day, equivalent to one person every 15 seconds, or 2.2 million people per year, due to illness or accidents related to their work. The number of men who died was twice more than women, because they were more likely to do dangerous work. Overall, occupational accidents have killed more than 350.000 people. The rest died due to illness suffered in work such as dismantling toxic chemicals and other diseases [2].

In Indonesia, the number of occupational accidents has been still very high. Data from PT Jamsostek (National Insurance for Workers) in 2009 showed that out of a total of 8.44 million active people registered as Jamsostek participants, there were 96.697 occupational injuries and occupational diseases, of which 3.1% were fatal and 12.7% such as permanent disability. The amount of compensation to be paid in the year was least IDR 328.510.754.184. While in West Sumatra, the number of occupational accidents reported by PT Jamsostek was 892 cases in 2009, 804 cases in 2010, 837 cases in 2011, 702 cases in 2012 and as many as 451 cases in 2013 [3].

Indonesian Primary Law (UUD) no. 13 year 2003 about Employment, Article 86 paragraph (1), stipulates that every worker is entitled to protection of occupational safety and health and morals, treatment in accordance with human dignity values and religious values. Then in paragraph (2), it is stated that to keep the workers safety in order to increase the optimal work productivity, there must be occupational safety and health efforts conducted. Furthermore, article of 190 also provides for Administrative Sanctions for breach of this provision [4].

According to the Joint Commission between the World Health Organization (WHO) and the International Labor Organization (ILO) in 1995, the defenition of Occupational Health is an effort to maintain and improve the physical, mental and social well-being of all the workers at the highest level. To prevent health problems caused by work conditions; to protect workers from risk factors of occupational health, and to maintenance the workers in a work environment adjusted to their physiological and psychological capabilities, and concluded as human adaptation of work and every human being to their work. Therefore, various efforts are needed to manage risk properly through risk management approach [3].

Risk management is very important for the continuity of a business or activity. Risk management is a tool to protect companies from any adverse possibility. Without risk management, the company deals with uncertainty. It can not know what hazards can be occured in the organization or company and what preparation efforts that needed. Companies that implement risk management will be gaining many benefits, such as ensuring business continuity, reducing the cost of mitigation, generating a sense of

security among shareholders about the viability of their investments, increasing awareness of each company's elements about risks, increasing employment and production effectiveness, as well as prevailing laws. One of the most popular tools and widely used tools to analyze the hazards in the workplace is called Job Safety Analysis (JSA) [5].

PT. P & P Lembah Karet Padang is one of the national private companies that produce and process crude rubber into crumb rubber and SIR 20. Its is the largest rubber factory in Padang City with total production of rubber SIR 20 reaches 24.000 tons per year. The number of workers are more than 308 people, spreaded across 26 parts of both daily and monthly shifts [6].

However, like every industry, there will always be consequences to bear behind every achievement. Based on existing data in PT. P & P Lembah Karet Padang, during January 2008 to May 2015, there were 96 cases of work accidents that had occurred and had caused the defects and injuries, where the most occurred in five sections, including in the Timbang section, the Gilingan section, in CR Section, in Press Section and in the Lory Wash section. While the rest spreaded in the workshop section, packing section, oven section, engineering section, machinery section, construction section and other sections. [6]

Until 2015, PT. P & P Lembah Karet Padang does not has a general Occupational Safety Expert in the company yet. The company also does not has ISO 14001 Certification (Management System standardization of Environmental Health) and OHSAS 18001 Certification (Management System Standardization of Occupational Health). Although it has ISO 9001 Certification (Quality Management Standardization) and has established some basic safety policies at work like the use of simple Personal Protective Equipment (PPE) such as the use of protective helmets or work boots, the rate of occupational accidents reflects the fact that potential hazards and risks accident at PT. P & P Lembah Karet Padang is still quite high and needs to be reviewed again, so that the appropriate solution efforts can be found, which will resulted to lower the number of occupational accidents. Or if necessary, to achieve Zero Accidents as the goal of implementation of health and safety policy. So, the company's losses due to accidents can be reduced, work effectiveness can be increased and company productivity will be increased. Based on the data and elaboration above, the researcher is interested to find out how the real risk condition in PT. P & P Lembah Karet Padang by Job Safety Analysis (JSA) method [6].

2. Methods

This research is a quantitative research with descriptive form. The study was conducted from June to September in the five sections that had the highest rates of accident and recurrence, namely the Timbang Section, Gilingan Section, Press Section, CR Section and Lory Wash Section. Primary data were obtained from field observation, while secondary data were obtained by company archive. The data analyzed using Job Safety

analysis (JSA) method which consisted of 3 stages, namely hazard identification, risk assessment and risk control recommendation.

3. Results

The result of hazard identification and risk assessment in the Timbang section described in Table 1 showed that there was still one phase of work that had a high risk but with minimal control, namely the job of lowering the raw material from the truck by using a Gancu. Gancu is used as a tool to take raw materials because the rubber material piled on the truck is sticky and stick each others, so it is more easily separated by using a sharp and pointed tool like gancu.

The result of occupational hazard identification and risk assessment in the Gilingan section illustrated in table 2 shows that there are still two phases of work that have high risk with minimal control, namely the work of moving raw materials from the pile to the washers by using gancu and inserting raw materials into the machine of enumeration.

At the enumeration phasee, workers who insert raw materials into the machine do not use any tools at all and directly use their hands. This poses a risk once the hand can accidentally be offended or inserted into the operating machine.

The hazard identification results as well as the risk assessment in CR section illustrated in table 3 show that there is no high occupational risk in the section. However, there are still moderate risks that also require control measures such as the possibility of developing respiratory diseases that threaten workers who move down the rubber blanket from the drying warehouses due to dust and flying smoke. In addition, it is also still has the risk of injured hands or feet when adjusting the size of the blanket material to be inserted into the weakening machine.

The results of occupational hazard identification and risk assessment in the Press section shown in table 4 indicate that there are two phases of work that are at high risk because they can cause permanent injury and has high chance to beoccured, especially on works involving the use of gancu and large knives that used for cutting blanket, and also to take it out of the oven and blower machine. The knife can cut the finger or the arm if the worker is not careful.

The result of occupational hazard identification and risk assessment in the Lory Wash section illustrated in Table 5 indicates that the only potential risk in this section is the slippery floor and the presence of Fire soda used as a rubber-cleaning material attached to Lory. Fire soda can cause various health problems such as burns, dizziness, pain, eye pain, even if exposed in the long term can lead to blindness.

4. Discussion

The risk in the Timbang section is one of the highest risks in PT. P & P Lembah Karet Padang. Because, based on occupational accident data in the factory, it is known that

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TABLE 1: Job safety Analysis in Timbang section.

Name of work Department Division Machine / tools	: Weighing Material :Timbang : Production :Big hook, knife, Truck, Froclife Car			Date Made by Accepted by Considered by				: 22 Sept 2015 : Aulia Rahman : Secretary : Renaldi Hady	
Phases of work	**Machine**	**Hazard potential**	**Risk**	**Risk Assessment**				**Control Action provided**	**More Control Action Recommendation**
				P	**S**	**Level of Risk**	**Desc**		
Pouring the raw material from the truck	Big hook	Sharp tool	Injury	3	3	**H9**	Non-Acceptable	Instruction of awareness	Providing security equipment, such as mask, boots, etc
Weighing the material	Big hook, big knife, scales	Sharp tool Heavy tool	Injury Pinched	3	2	**M8**	Non-Acceptable	Instruction of awareness	Providing security equipment, such as mask, boots, etc
Collecting the material that had been weighing	Froclife car	The raw collection is tall	Hit	1	2	**L2**	Acceptable	Instruction of awareness	-

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TABLE 2: Job Safety Analysis in Gilingan Section.

Name of work Department Division Machine / tools	: Material Milling : Gilingan : Production : Big hook, knife, washing box, Breake Machiner, Hamme Machine, Creper Machine, Mangel Machine, Mixing Tank, Lift, Wagon							Date Made by Accepted by Considered by	: 28 Sept 2015 : Aulia Rahman : Secretary : Renaldi Hady
Phases of work	**Machine**	**Hazard potential**	**Risk**	**Risk Assessment**				**Control Action provided**	**More Control Action Recommendation**
				P	**S**	**Level of Risk**	**Desc**		
Moving material to the washing spot	Big hook	Sharp tool	Injury	3	3	**H9**	Non-Acceptable	Instruction of awareness	Providing security equipment
Cleaning material	Washing box	Dirty waste	Itchy	3	1	**M5**	Acceptable	-	Providing security equipment
Breaking material with mesin Breaker	Breaker Machine	Auto machine	Hit by machine	2	1	**L3**	Acceptable	Instruction of awareness	-
Selecting trash from material and throw it to bin	-	Auto machine	Hit by machine	2	1	**L3**	Acceptable	Instruction of awareness	-
Inserting material into Hammer Machine	Hammer Machine I, II dan III	Auto machine with heavy tools	The hand smashed by machine	4	1	**H10**	Non-Acceptable	Instruction of awareness	Providing security equipment and more tool to help
Mixing material in mixing tank	Mixing Tank	Auto machine	Hit by machine	2	1	**L3**	Acceptable	Instruction of awareness	-
Milling Material	Creper Machine	Auto machine	Hit by machine	2	1	**L3**	Acceptable	Instruction of awareness	-
Compaction Material	Mesin *Mangel*	Auto machine	Hit by machine	2	1	**L3**	Acceptable	Instruction of awareness	-
Moving rubber blanket to the drying spot	Wagon	Heavy	Hit and injury	2	2	**M6**	Non-Acceptable	Instruction of awareness	Providing more useful tools and security equipment
Hanging the rubber blanket in drying spot	Lift	Height	Falling	2	3	**M8**	Non-Acceptable	Instruction of awareness	Providing safety lift and equipment

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TABLE 3: Job Safety Analysis in CR Section.

Name of work : Peremahan								Date : 22 Sept 2015	
Department : CR								Made by : Aulia Rahman	
Division : Production								Accepted by : Secretary	
Machine / tools : Cutter Machine, Knife, Lory, Oven Machine								Considered by : Renaldi Hady	
Phases of work	**Machine**	**Hazard potential**	**Risk**	**Risk Assessment**				**Control Action provided**	**More Control Action Recommendation**
				P	**S**	**Level of Risk**	**Desc**		
Taking rubber blanket	-	Dust	Cough and respiratory disease	2	2	**M6**	Non-Acceptable	Instruction of awareness	Providing security equipment like a mask, etc
Cutting and putting rubber into the cutter machine	Big Knife	Sharp tool	Injury	2	2	**M6**	Non-Acceptable	Instruction of awareness	Menyediakan APD seperti sepatu bot, pengaman *ankle* dll
Inserting material on the lory	Lory	Slippy	Falling	2	1	**L3**	Acceptable	Instruction of awareness	-
Inserting materials to oven machine	Oven machine	Heat	Burned / injury	2	1	**M6**	Acceptable	Instruction of awareness	-

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TABLE 4: Job safety Analysis in the Press Section.

Name of work Department Division Machine / tools	: Press and Wrapping : Press : Production : B*lower Machine*, *Press Machines,* Weigh, Big knife, Froclife Car							Date Made by Accepted by Considered by	: 22 Sept 2015 : Aulia Rahman : Secretary : Renaldi Hady
Phases of work	**Machine**	**Hazard potential**	**Risk**	**Risk Assessment**				**Control Action provided**	**More Control Action Recommendation**
				P	**S**	**Level of Risk**	**Desc**		
Pulling out rubber blanket from Lory	Blower Machine, Knife	Sharp Knife	Cut / Injury	3	3	**H9**	Non-Acceptable	Instruction of awareness	Changing the tools Providing safety equipment
Cut and weighing rubber blanket	Big knife, weigh machine	Sharp Knife	Cut / Injury	3	3	**H9**	Non-Acceptable	Instruction of awareness	Changing the tools
Inserting Rubber Blanket into press machine	*Press* I and II machine	Automachine	Hit by automachine	2	1	**L3**	Acceptable	Instruction of awareness	-
Packing / the rubber Blanket	Plastick, wrapping tools	Sharp tools	Injury	1	1	**L1**	Acceptable	I Instruction of awareness	-
Putting products into pallets	Froclife car, Pallet	Heavy tools	Pinched/ Injury	2	2	**M6**	Acceptable	Instruction of awareness	-

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TABLE 5: Job safety Analysis in the Press Section.

Name of work Department Division Machine / tools	: Lory Wash : Lory Wash : Production : Washer, Lory, Fire soda							Date Made by Accepted by Considered by	: 22 Sept 2015 : Aulia Rahman : Secretary : Renaldi Hady
Phases of work	**Machine**	**Hazard potential**	**Risk**	**Risk Assessment**				**Control Action provided**	**More Control Action Recommendation**
				P	**S**	**Level of Risk**	**Ket**		
Moving *Lory* to the wash	*Lory*	Slippery fIloor	Slipped /fell	2	1	**L3**	Acceptable	Instruction to be careful	-
Cleaning the residual rubber on lory	Gancu	Gancu is sharp	Hand/ feet injured	2	2	**M6**	Non Acceptable	Instruction to be careful	Replacing gancu other safer tool Providing better PPE
Cleaning the whole surface of *Lory* from residual rubber	Fire soda	Fire Soda spreaded	Exposed to body parts	2	3	**M8**	Non Acceptable	Instruction to be careful	Providing better PPE

the incidence of occupational accidents in this section is very frequent and result in significant impact for workers such as injured, temporary disability or permanent disability. Cases like ”Feet or arms exposed” or ”Foot or hand cut wounded knife” can not be eliminated and always repeated almost every year.

The Company should undertake a serious control effort to address the risks involved in this section immediately. Forms of efforts that have been applied previously have not been effective enough to prevent the existed risks. The recommended advanced control measures as indicated by table 1 may be considered by the company to be implemented.

Risk in the Gilingan Section is also one of the highest risks in PT. P & P Lembah Karet Padang. Because, based on occupational accident data in the factory, it is known that the number of incidents of occupational accidents in this section is higher when compared to other sections, and resulted in significant impact for workers, such as injured, temporary disability or permanent disability. Cases like ”Feet or hand exposed to iron” or ”Foot or hand pinched / hit by cart” can not be eliminated and almost always repeat every year. Other incidents such as ”Hand torn wounds hit by the mill” are dangers that can cause lifelong disability, or even worse cause the death.

The Company should undertake a serious control effort to prevent the risks in this section immediately. Efforts that have been implemented previously have not been effective enough to solve the danger and existed risks. The recommended advanced control measures as indicated by table 2 may be considered by the company to be implemented.

In the CR section, there is no high risk. However, in that section, there is still a medium risk that also needs to be controlled. The company still need to make efforts to overcome these risks in order to increase the health status of the workers. The hazards in this section can be solved by efforts to provide PPE like masks and boots for workers as shown in table 3.

In the press section, there are two phases of work that have a high risk because it can cause permanent injury and have a high possibility to occur, especially works that involving the use of a gancu and a large knife used to slice the blanket so that came out of the oven and blower. The knife can cut the finger or the arm if the worker is not careful.

The Company shall take immediate control measures to reduce or eliminate risks in that section. For example by providing an automatic cutting machine, as well as with an automatic packaging machine. If not possible, the company may provide security equipment for workers such as hand / elbow or other protective equipment as shown in table 4.

The press section is one of the vital section in the production process, where the final process rubber would be weighed and packed in this section. If the disturbance in that section continues, it will disrupt the packaging process and reduce the daily production amount.

The only danger that threatens in the Lory Wash section is the slippery floor and the presence of Fire soda which is used as a rubber cleaning material that sticks to Lory.

Fire soda can cause various health problems such as burns, dizziness, pain, eye pain and even blindness.

The company should provide more modern lory equipment such as automatic lory washers. If not possible, the company may provide safety clothing that isolates the fire soda, so it will not be exposed to the worker while washing the lory. The recommended control effort shown in table 5.

5. Conclusion

Based on this research about Occupational Risk Assessment using Job Safety Analysis (JSA) method that has been conducted in PT P & P Lembah Karet Padang, it can be concluded that there is still one phase of work that has high risk level in the Timbang Section, there is also medium risk and low risk at several other stages of work. There are still several phases of work that have high risk levels in the Gilingan Section. There are still several phases of work that has a high risk level in the Press Section. There are also medium risk and low risk at several other phases of work. There is no high risk in Press Section and Lory Washing Section. However, there is still moderate risk and low risk at several other stages of work.

It is advised to the company to immediately implement various risk control efforts on working sections that has medium and high risk levels. The efforts that already exist in some sections of PT. P & P Lembah Karet Padang has been still lacking. Then, the company also need to immediately provide certified occupational safety experts to improve the implementation of occupational safety and health in the company. For further efforts, the company can cooperate with various health agencies in order to improve the welfare of workers, such as Puskesmas (health center), Insurance Agency, etc. It is also advised for workers to seriously apply some policies that have been made by the company to improve health and safety, like using personal protective equipment (PPE) and perform the phases of work in accordance with the proper procedure.

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