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ANALYSIS OF POTENTIAL SAFETY HAZARD ON THE METAL HOLDER INDUSTRIES IN CEPOGO VILLAGES AT BOYOLALI REGENCY

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ABSTRACT

56% of the population on Cepogo working as metal craftsmen. The process of making metal crafts through several stages; First: pattern making is drawing or printing pattern on aluminum plate. Then pattern is cut according to mold using welding, at this stage generated a lot of metal dust. The next is: forming a texture by beating on the aluminum plate continuously, that produced high impulsive noise around 105 dBA or exceeds the Threshold Limit Value. Third stage: grafting, to be the desired form of craft. The last is finishing, to perfect the shape and coloring of handicrafts using H₂SO₄ and HNO₃ which is irritative so that cause the dermatitis contact cases amongs the workers.

This activity is a combination of research activities as the first step to analysis the potential hazard then followed by implementation steps through community service activities. The type of research is descriptive with observational and participatory approach. While the data collection techniques is observation of the work environment and FGD.

Based on the results can be seen that the workplaces have serious safety problems include: high impulsive noise, metal dust, the yuge number of irritant chemicals used, doing jobs at risk such as: welding and grinding. Besides, neither the entrepreneur nor the worker has understood the importance of safety program, They have not identified the hazards in the workplace or controlled the work environment appropriately. Furthermore the Cepogo's Health Center does not have health surveillance system yet, so that the working health status of the workers in the Cepogo metal industry is not well monitored.

Suggestion given include administrative and personal control approach like: make the Safe Work Permit, conduct the OSH training program, arrange the OSH management booklet to conduct induction, provide Personal Protective Equipment, establish the manual handling of irritative chemicals and establish the health surveillance system.

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1. INTRODUCTION

Industrialization in Indonesia is growing rapidly as technology develops more sophisticated and modern. One of the consequences of this rapid industrial development is the time required for the production

process can reach 24 hours, so it can potentially increase work fatigue, occupational diseases and occupational accidents that affect the decline in productivity (Tarwaka et al, 2004: 78).

The unqualified working environment has a profound effect on the health of the workforce. For example, work environments that have noise exceeding the Threshold Limit Value may cause worker health impact, especially auditorial impacts that are directly related to hearing functions such as decreased worker hearing. Furthermore it also causes work fatigue so that it can have an impact on the inhibition of production process, and ultimately also impact on the decline in the productivity of the company (Suma'mur, P.K; 2009: 358). According to the World Health Organization (2012: 1) noise can cause high prevalence of hearing loss. In Southeast Asia the prevalence of hearing loss is around 156 million people or 27% of the total population. While in adults under the age of 65 years, 49 million people or 9.3% caused by the loud sound produced in their workplace. According to the National Committee for Hearing Loss and Deafness in 2014, hearing impairment due to noise in Indonesia is the highest in Southeast Asia, which is about 36 million people or 16.8% of the total population. While on the other hand according to the rules of the Minister of Manpower and Transmigration (2011: 2) about the Threshold Limit Value in the workplace, said that the Threshold Limit Value of 85 dBA is defined as the highest intensity and is a value that is acceptable to workers without causing health-related illness or hearing loss in daily work. Day for a time not exceeding 8 hours a day or 40 hours a week.

Cepogo Boyolali Metal Industry Center is one of the informal industry of metal craftsmen in Indonesia. This metal craft industry is located in Cepogo Village Boyolali District which produces various handicrafts such as interior decoration of home and others which made from metal main raw namely: copper, aluminum, brass and iron.

The population of Cepogo Village is 1,264 people, with 56% of the population working as metal craftsmen totaling 652 people. The process of making metal crafts through several stages; The first stage: pattern making is drawing or printing pattern on the aluminum plate that will be made craft, then the pattern is cut according to the mold by using welding. At this stage a lot of metal dust produced from the production process. The second stage: forming a motive or texture that is by doing beating on the aluminum plate continuously so that the appropriate texture is produced. At this stage a large impulse noise is generated. Third stage: grafting is at this stage is done grafting between the aluminum plate one with the other aluminum so that the desired form of craft is produced. While in the last stage of finishing, at this stage is done to perfect the shape and coloring handicraft products by using sulfuric acid chemicals (H₂SO₄) and nitric acid (HNO₃) which is irritative.

Based on the background it can be seen that the metal industry center has many problems related to Occupational Safety and Health such as: high noise, the amount of metal dust produced from the production process, the use of irritating chemicals such as: sulfuric acid (H₂SO₄) and acids Nitrate (HNO₃) and not appropriate of OSH implementation standards, the researcher wants to investigate of the potential hazard in the metal industry center in Cepogo village that can affect the work productivity.

2. RESEARCH METHOD

This activity is a combination of research activities as the first step to investigate of the potential hazard in the metal holder industry in Cepogo village that can affect the work productivity then followed by implementation steps through community service activities. The type of this research is descriptive with observational and participatory approach. While the data collection techniques in this study is through observation of work environment and FGD. Researchers observe work processes, work tools, work materials, chemicals involved on the work process. Then complete the information by conduct focuss group discussion with the business owners, workers and Principal of Primary Health Center (Puskemas).

3. RESULTS AND ANALYSIS

On the production activities, the manufacture of metal craft is using the main raw material as well as supporting raw materials. Main raw materials include: copper, brass, aluminum while supporting materials, such as: paper, resin sap ("jabung"), red sand and cloth. While machines and work tools used include: grinding, machine selep, blower and furnace, compressor, genset, iron hammer, wooden hammer ("gandhen"), iron base ("suwul"), buffer of "suwul" ("jantur"), chisels ("tatah"), metal scissors, carbide welding, jeans fabrics, sandpaper, markers, large size "jangkar" and metal brushes.

From the noise measurement results obtained the highest noise level that exist in the workplace at the Cepogo metal industry center that is 113 dBA and the lowest is 75 dBA. So obtained Leq exceeds the

Threshold Limit Value of 105 dBA (Laziardy, 2017). By the observation of the work environment, it is known that in the second stage, the formation of handicraft texture, in which the aluminum slab is repeatedly beaten to obtain the desired texture as well as to smoothing the aluminum pieces resulted in high impulsive noise resulting in many complaints over the work environment inconvenience.

The administration and personal control program that can be done in this workplace include: preparation of Safe Work Permit especially for work that produce high noise, giving OSH training related to hearing conservation program, preparation of OSH management booklet for workers as work accident prevention and occupational diseases for high-noise jobs, publish the SOPs for Personal Protective Equipment in the workplace, provide the Personal Protective Equipment such as: ear plug and publish the health surveillance model of worker related to hearing conservation.

On the other hand, almost all existing stages of work can produce metal dust which can potentially decrease Vital Lung Capacity for its workers. Among other things are the stages: metal cutting, grinding, metal beating and metal grafting. So many workers who experience health complaints such as: cough, shortness of breath and exposed to splashes of metal splinters. The administrative and personal controls that can be done to overcome the metal dust problem, include: publish the Safe Work Permit to control metal dust problem, giving OSH training to overcome the metal dust at the workplace, publish the OSH management booklet for the workers as prevention of occupational accidents and occupational diseases related with metal dust, publish the SOPs for use of Self-Respiratory Protective Equipment, provide the Personal Protective Equipment like: respirator mask for metal dust, and publish the health surveillance model for metal dust related work.

Furthermore, based on the observation results also known that in the process of forming and painting (finishing) many use of irritating chemicals, so the case of contact dermatitis many found at the workplaces, especially on the workers in that process. The chemicals used include:

- H₂SO₄ and H₂O₂ for cleaning copper,
- HNO₃ to clean brass,
- Cyanide acid to clean black-colored copper
- NaOH to clean aluminium,
- Sn to give copper color,
- Tiner to thin clear,
- HCl to connect copper.

Administrative and personal control measures that can be taken to overcome the hazards of these chemicals include: publish the Safe Work Permit for work related irritating chemicals, giving OSH training especially irritating chemicals manual handling at the workplace, preparation of OSH management booklet for workers as an effort to prevent work accidents and occupational diseases related irritating chemicals, publish SOP for using the PPE in the workplace, publish of irritative chemicals manual handling, provide Personal Protective Equipment such as: work clothes, rubber shoes, vinyl gloves, PVC apron, chemical respirator and goggles. As well as making health surveillance model related to irritating chemicals.

Based on the result of measurement of subjective fatigue measured by questionnaire measuring the feeling of fatigue of work (KAUPK2) got the respondent who is "not tired" as much as 2 worker (8%), the respondents who "lightly" tired as many as 5 workers (20%), 8 workers (32%) who get "moderate" tired, "tired" respondents as many as 6 workers (24%), while "very tired" respondents as many as 4 workers (16%) (Laziardy, 2017). This fatigue is one of the worker's response to the environment. This fatigue condition can trigger workplace accidents and the occupational diseases that have a direct impact to decrease the work productivity. On the other hand the number of absentism also looks very high. At UD. A & D from 30 workers found that the absentism rate reached 1-2 people/week, while the UD. Pamungkas of 35 people can be seen that the absentism number reached 2 people/week.

The high number of noise, metal dust, the number of contact dermatitis incidents, the high percentage of worker fatigue, can result in the high rate of absentism then resulting in low productivity. While administrative and personal controls program that can be done to prevent the incidence of occupational accidents and diseases include the preparation of Safe Work Permit on welding dan grinding process, giving OSH training especially on the work at the high risk, publish of OSH management booklet for the workers to prevent occupational injuries and occupational diseases, publish the SOP on OSH aspects, provide the appropriate Personal Protective Equipment for each stage of the work process and publish the health surveillance especially related to work at the high risk like: work related to irritating chemical, welding and grinding work.

This recommendation is in line with research conducted by Evi stating that provide hearing protective device, regular education and training for the employer and employees, implementation of hearing conservation program at the workplace, and regular health surveillance can help address the problem (Win, 2015).

After the OSH intervention program such as OSH control program above that done through by community services program, it can be seen that there has been an increase of knowledge of business owner and its worker is 82,4%. This knowledge enhancement is characterized by an increasing of the average post test score of 70 from the average pre test value of 38,4 in both workplaces.

4. CONCLUSION

Based on the result of this activity can be seen that in the two metal holder industries in Cepogo Boyolali have serious safety problems include: high impulsive noise, metal dust, the yuge number of irritant chemicals used, doing jobs at the high risk such as: work related to irritating chemical, welding and grinding. Besides, neither the entrepreneur nor the worker has understood the importance of safety program, They have not identified the hazards in the workplace or controlled the work environment appropriately, and the Cepogo's Health Center does not have a health surveillance system so that the working health status of the workers in the cepogo metal holder industry is not well monitored.

Suggestion given include administrative and personal control approach such as: make the Safe Work Permit, conduct the OSH training program, publish the OSH management booklet to conduct the safety induction, provide the appropriate Personal Protective Equipment for the workers based on their activities of the work, establish the manual handling of irritative chemicals at work place and establish the appropriate health surveillance system.


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