HEALTH RISK ASSESSMENT IN THE UTILITY AREA OF LUBRICANT PRODUCTION LIMITED LIABILITY COMPANY

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ABSTRACT

Health Risk Assessment (HRA) is a part of risk assessment. The utility area at X Ltd., Lubricant Production Unit of Gresik use machines that impact on health due to noise and temperature hazards. This study aimed to identify health risk assessment in the utility area at X Ltd., Lubricant Production Unit in Gresik. This was an observational descriptive study with a cross-sectional design used a total population of 9 people including 1 supervisor for Health Safety Environment (HSE), 3 HSE officers, and 5 workers. Primary data were obtained from interviews, observations, as well as noise and temperature measurements. Secondary data were retrieved from the company's documents. The data were assessed in terms of the likelihood and severity to count the risks. Afterwards, the risk control was assessed, and the residual risk was calculated. The results showed that 3 work steps had 6 potential hazard noise and temperature in the utility area. The risk assessment showed the levels of risk were categorized into medium risk and low risk. The medium risk was found in the boiler monitoring and compressor. While the low risk was found in the stage of preparing CNG gas and turning on the machines. The control effectiveness was 75%. The residual risk was grouped into a low risk and no risk. It can be concluded that the potential hazard in the utility area was noise. Most of the risks found in this area were categorized as low risks. The company has properly implemented the risk control. Therefore, there will be no residual risk. The company should monitor the implementation of controls, such as fit to work, the use of Personal Protection Equipment (PPE), promoting staff how to use PPE, giving rewards and punishments to motivate workers to have safe behavior at work.

Keyword: health risk assessment, utility area, risk control.

ABSTRAK

Health Risk Assessment (HRA) adalah salah satu bagian dari risk assessment. Pada utility area di PT X Lubricant Production Unit Gresik dalam proses produksinya menggunakan mesin yang dapat berdampak pada kesehatan akibat bahaya kebisingan dan suhu. Penelitian inni bertujuan mengidentifikasi penilaian risiko kesehatan pada utility area di PT X Lubricant Production Unit Gresik. Penelitian ini merupakan penelitian deskriptif observasional dan menggunakan desain potong lintang. Penelitian ini menggunakan total populasi berjumlah 9 orang terdiri dari 1 pengawas Kesehatan dan Keselamatan Lingkungan, 3 staf bagian Kesehatan dan Keselamatan Lingkungan, dan 5 pekerja. Data primer diperoleh dari hasil wawancara, observasi, pengukuran kebisingan dan suhu. Sedangkan, data sekunder berupa dokumen dari perusahaan. Teknik analisa data dinilai berdasarkan likelihood dan severity. Lalu, dilakukan penilaian pengendalian risiko dan perhitungan risiko sisa. Hasil penelitian ini menunjukkan pada utility ada 3 tahapan kerja dengan 6 potensi bahaya yaitu kebisingan dan suhu. Berdasarkan penilaian risiko terdapat tingkat risiko yaitu risiko sedang dan rendah. Risiko sedang ditemukan pada tahap monitoring pendidih dan kompresor. Sedangkan, risiko rendah ditemukan pada tahap mempersiapkan gas CNG dan menghidupkan mesin. Efektifitas pengendalian yaitu 75 %. Risiko sisa dikelompokkan menjadi risiko rendah dan tanpa risiko. Dapat disimpulkan, potensi bahaya yang dominan pada utility area adalah kebisingan. Mayoritas penilaian risiko yaitu risiko rendah. Upaya pengendalian diterapkan dengan baik. Oleh karenanya, tidak aka nada risiko sisa. Perusahaan disarankan melakukan pengawasan penerapan pengendalian yang terdiri atas kelaikan kerja, penggunaan Alat Pelindung Diri (APD), sosialisasi penggunaan APD, pemberian hadiah dan hukuman agar memotivasi pekerja memiliki perilaku aman dalam bekerja.

***Keyword**: penilaian risiko kesehatan, utility area, pengendalian risiko*

 License doi: 10.20473/ijph.vl15il.2020.224-235 Received 15 October 2018, received in revised form 30 October 2018, Accepted 22 January 2019, Published online: August 2020

INTRODUCTION

Occupational accidents or health problems can occur due to hazardousjob or work environment. The Regulation of the Indonesian Ministry of Employment Number 10 of 2016 about the procedures for work return program and promotional activities and preventive accidents and occupational illness in Chapter 1 states that diseases at work are caused by work features and environment. According to International Labour Organization (2017), globally around 860,000 workers experienced occupational accidents and occupational diseases every day, and 6,400 workers died every day due to occupational accidents and diseases. The Indonesian Ministry of Health mentioned the number of occupational diseases during 2011-2013 was 57,929 in 2011, 60,322 in 2012, and 97,144 in 2013 (Ministry of Health, 2014)

The work environment may contribute to occupational diseases or health disorders. An unhealthy unqualified work environment can cause health impairment that decrease the workers' productivity. Health disorders occur due to physical, chemical, biological, ergonomic, and psychological factors. The physical factors include noise, illumination, radiation, vibration, and temperature, while the chemical factors are hazardous chemicals passing through inhalation, food consumption, and exposure to the skin. In addition, the biological factors include bacteria, viruses, and fungi. Lastly, the ergonomics factor is related to how a worker positions their body during working, while the psychological factor is about the mental condition at work.

Manoj (2017) stated that oil and gas companies were one of the donors to the biggest companies that mostly harm physical condition of the workers. Furthermore, Vusumuzi (2015), mentioned oil and gas companies caused an occupational illness, such as Noise Induce Hearing Loss (NIHL) due to the excessive noise in the work environment. Fifty-six workers in an oil and gas company experienced NIHL in South Africa.

Noise is an unwanted sound from a production tool or a work tool. Noise in oil and gas companies can be a result of the operating machinery exposed to workers daily. A study conducted by Prima Fithri (2015) at X Ltd., Lubricant Production Unit in Gresik RU II Dumai found the utility area had a high noise potential in which the machine operated 24 hours nonstop, which wasvery influential in labors' hearing. Due to the high noise, the workers may experience communication and hearing impairment.

In addition to noise exposure, another physical factor due to the high work production is room temperature. Hot room temperatures in the workplace can result in occupational diseases. One of the studies conducted by Bourney (2015), stated that 20 workers in oil and gas companies died due to heatstrokes. According to the Occupational Safety and Health Administration OSHA (2014), hot room temperature increases the incidence of occupational disease.

Hot room temperature causes blood flow from the body to the skin. When workers continue to be exposed to heat, they will suffer from heat cramps, heat rash, and heat exhaustion. If they did not immediately get a medical treatment, they will get a heatstroke. Moreover, Ollie (2016) as many as 29 diseases were reported because of heat in their oil and gas workers in Australia.

The X Lubricant Production Unit Limited Liability Company in Gresik is a company that engages in the production of lubricants and asphalt. The company has five production process, such as the acceptance and filling of raw materials, blending, filling, packing, and warehousing.

The company uses base oil of raw materials and addictive substances in which the production process uses automatic machines and pipes thereby reducing a direct contact with chemicals in workers. Based on the secondary data, the work environment in the five production

processes under the threshold evaluation system measures noise, chemical, temperature, and humidity. In the utility area, the company has not measured from the noise, temperature, and humidity. The utility area is a place where the production support machine is located and produces steam for machine drives production.

Based on fit to work, working in oil and gas companies has a high risk of health because workers can work in 24-hour shifts depending on the production process or customer order. The fit to work is a health check before work, i.e., workers were examined in terms of pulse blood pressure, visual acuity test, and balance tests. The company has not conducted medical checkups and done a health risk assessment. Therefore, it is necessary to prevent occupational health hazards.

Production activity in the utility area allows potentials for noise and high temperature hazards. Based on the interviews with workers, all workers in the utility area complained of difficulty in communication and hearing impairment. Previously, the company had not conducted audiometric examinations so that noise hazards have not been found. Based on the observation, the workers sometimes used earplugs that the initial measurement result was at 91 dB noise with the exposure duration for 160 minutes. This measurement exceeded the threshold evaluation system.
Continuous machine operation and exposure to sun in the outdoor can lead to dizziness, palpitations, and stress due to heat. The early measurement of temperature was 27.5 ^{o}C calculated using the heat index for measuring temperature and humidity.

Many health disorders or occupational diseases were caused by noise pollution and high temperatures. To prevent health disorders or occupational illness, a risk assessment was done using the Health Risk Assessment (HRA) method which identifies hazards affecting to workers' health. According to *Government of Western Australia Departemernt of Health* (2010), defined the HRA assessment as a systematic identification related to health hazards in the workplace to reduce the risk of exposure to precise control. The risk control includes elimination, substitution, technical control, administration, and provision of Personal Protection Equipment (PPE) (Tarwaka, 2012).

Research conducted by Alifia (2016) at SMART Ltd. used the HRA in conducting the risk assessment. The results of the research found the company had a high risk of health problems due to noise, working climate, and lighting. In addition to difficult in communication and hearing impairment, the workers also complained of fatigue and sweating. The measurement of working climate exceeded the threshold evaluation system. The exposure to lighting measurement did not follow the regulations so that the workers suffered from bleary eyes, eye fatigue, and conjunctivitis.

The results of health risk assessment can be a consideration to improve the risk control so that the workers can work safely. Conducting the health risk assessment in the prevention of health hazards was required to be researched in the utility area at X Lubricant Production Unit Limited Liability Company in Gresik. The purpose of this study was to identify the health risk assessment in the utility area at X Lubricant Production Unit Limited Liability Company in Gresik.

METHODS

This study has passed the ethics approval with the ethics code of No: 428-KEPK by the Faculty of Public Health, Universitas Airlangga. This study was conducted at Lubricant Production Unit Limited Liability Company in Gresik from April 2018–January 2019. This study was descriptive observational with a cross-sectional design, giving an overview of the risk assessment in the utility area at X Lubricant Production Unit Limited Liability Company. The data were collected from the observation at one time.

The total population consisted of 9 people, including 1 supervisor of Health Safety Environment (HSE), 3 HSE officers, and 5 workers in the utility area. The variables in this study included hazard identification, risk assessment, risk control, and residual risk assessment. The primary data were collected through interviews, observation of noise and temperature measurement. The researchers conducted the interviews to the supervisor HSE, HSE officers, and workers in the utility area regarding the identification of the health problems and working stages in the utility area. The likelihood, severity, and risk control were already applied. The researchers conducted a direct observation on the utility area as well as the working stage of labor to identify the potential danger and cater the measurement of noise and temperature. The secondary data were retrieved from the company's documents covering the results of work environment measurement. The primary data were processed and analyzed by determining the likelihood and severity, and the risk control and the residual risk were calculated. The results of the data analysis were presented in the form of tables and analyzed narratively to draw conclusions.

RESULT

Working environment measurement

The measurement of the working environment was performed to determine if the utility area existed beyond the threshold evaluation system. Noise and temperature measurements were conducted in September 18th, 2018 at 14:00 and in September 25th 2018 at 13:00.

Noise

Table 1 shows the results of the noise measurement in the utility area of X Lubricant Production Unit Limited Liability Company, Gresik. Noise measurement using Sound Level Meter (SLM) was performed on 6-point noises derived from the production machine in the utility area. This machine can operate for 24 hours or a long shift depending on customer's order. The machine included a boiler machine, compressor, reserve osmosis, condensate tank, cooling tower, condensate tank, cooling tower, condensate cooler, air dryer, and diesel engine generator. Based on the interviews, the workers complained about the difficulty in communication and hearing impairment. The noise measurement of boiler and compressor was above the threshold evaluation system at 91 dB with 160-minute exposure. According to Minister of Manpower regulations No. 05 of 2018, the 2-hour duration of exposure to 91 dB noise could impair hearing.

Table 1. Noise measurement and duration of labor exposure in every working stage

Working stage	Result	Exposure time	Description
Preparing CNG gas	72 dB	30 minutes	< Threshold Evaluation System
Turning on the machine	91 dB	30 minutes	< Threshold Evaluation System
Monitoring on boiler and compressor m	91 dB	160 minutes	> Threshold Evaluation System

Temperature

Table 2. Temperature and humidity measurement and heat index in each working stage

Working stage	Temperature	Moisture	Description
Preparing CNG Gas	27,5	64 %	Lower
Turning on the machine	27,5	65 %	Lower
Boiler compressor Monitoring	27,5	65%	Lower

Table 2 shows the results of temperature and humidity measurements compared to the heat index table for Occupational Safety and Health Administration (OSHA). The OSHA in a lower category means the workers are in safe conditions. The results of interviews with five workers in the utility area showed they did not complain of fatigue, sweating, difficulty in urination, thirst, and stress due to heat.

Blood Pressure and Pulse

The blood pressure was checked in terms of systole and diastole and pulse screening. The results showed the workers in the utility area had no change in the blood pressure and pulse during working. Noise in the utility area did not result in stress that could increase blood pressure and pulse. Additionally, the high temperature did not result in dehydration, and the workers did not show physiological symptoms due to high temperature, such as difficulty in urination and and hot dried skin. Dehydration could lower the blood pressure and increase the pulse due to electron transfer disorders in the body. When dehydration lasts long, it can result in heatstroke and death.

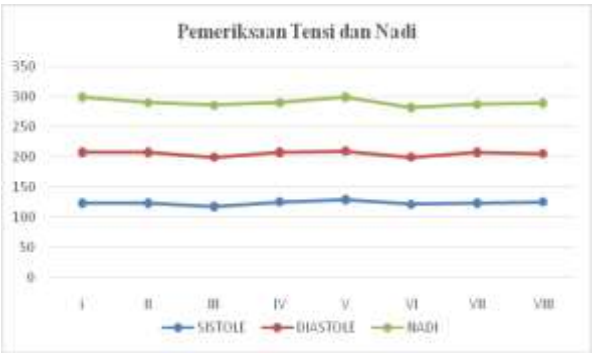

Figure 1. Blood pressure and pulse screening on the workers in the utility area in 2018

Hazard Identification

The first stage to determine the cause of health disorders is hazard identification. According to OHSAS 18001, hazard identification is a systematic effort to identify the potential hazards that exist in the workplace to avoid occupational diseases (Ramli, 2010). Hazard identification urges the company to identify the sources of hazards, events, and causes, as well as the consequences of propabilities for accidents or occupational diseases (ISO 31000, 2009).

The results of hazard identification consists of three working stages; preparing CNG, powering the engine, monitoring boilers and compressors. This study found six potential hazards including noise and temperature.

Noise could be caused by the machine operation, which could disrupt the listener's audio sense (Suma'mur, 2009). In the monitoring stage, the 91 dB noise and 160-minute exposure exceeded the threshold evaluation system. Meanwhile, the noise measurement in the preparing and turning stages was below the threshold evaluation system.

High temperatures are caused by machines and exposure to outdoor temperature or direct sunlight. High temperatures can result in fatigue, sweating, difficulty in urination, thirst, and stress due to heat. The temperature measurement was in the lower category, which was compared to the heat index for Occupational Safety and Health Administration (OSHA).

Risk Assessment

The risk assessment is part of risk management, which is done after the hazards identification to evaluate the magnitude of risks and their impacts. This assessment process is derived from the multiplication of the likelihood and severity of each hazard. The likelihood is a possible occurrence of health complaints due to exposure to noise and temperature in the utility area. The factors affecting likelihood are the use of PPE, maintenance, duration, and duration of exposure. Severity is a health complaint arising from the exposure of noise and temperature in the utility area. Factors that affect severity were types of

health disorders and economic loss (Puspita, 2017)

The risk rate was obtained from the interviews with the HSE officers, HSE supervisor, and workers and analyzed using the risk assessment matrix to determine the category. Once the risk assessment was carried out, the evaluation of the risks was to determine the scale of priorities for whether the risk is acceptable or does not refer to the applicable risk criteria applied by the company.

Table 4. Likelihood scale

Level	Value	Description
One	Rare	No accident or health complaint in a year with the duration of exposure below the threshold evaluation system
Two	Unlike	At least one accident or health complaint every three months with the duration of exposure equal or above the threshold evaluation system
Three	Possible	At least one accident or health complaint in a month with the duration of exposure equal or above the threshold evaluation system
Four	Likely	No accident or health complaint every week and the duration of exposure exceeding the threshold evaluation system
Five	Almost Certain	Accidents or health complaints every day with the duration of exposure exceeding the threshold evaluation system

Source : (AS/NZS 4360. *Australian/New Zeland*, 2004)

The higher level of likelihood will worsen health complaints due to the working environment, especially noise and temperature. It indicated that the work environment was less secure because of exposure duration, the use of PPE, and maintenance process, and thus it was necessary to prevent this danger.

Table 5. Severity scale

Level	Value	Description
One	Not significant	No injury, a slight financial loss
Two	Small	Mild injury (first aid or medical treatment required but not causing labor restrictions or loss of working hours)
Three	Medium	Moderate injury (medical treatment required and causing restrictions or loss of working hours ≤ 24 hours, moderate financial loss)
Four	High	Injuries (medical treatment required and causing loss of working hours ≥ 24 hours or the inability of temporary work and major financial loss)
Five	Disaster	Death toll and severe loss in the entire activity

Source : (AS/NZS 4360. *Australian/New Zeland*, 2004)

Severity is some burdens and losses caused by the working environment, especially noise and temperature in the utility area. The types of health disorders and economic loss could affect the level of severity. If it is a mild health disorder, the severity will also be mild. Besides, more economic losses will make the severity higher. As a result, it may cause the workers dead and the production activity missed.

Table 6. Risk matrix

Likelihood	Severity				
	Not significant (First)	**Small (Second)**	**Are (Three)**	**Weight (Four)**	**Disaster (Five)**
Almost Certain (Five)	Medium	Medium	High	High	High
Likely (Four)	Low	Medium	High	High	High
Possible (Three)	Low	Medium	Medium	High	High
Unlike (Second)	Low	Low	Medium	Medium	Medium
Rare (First)	Low	Low	Low	Low	Medium

Source: (AS/NZS 4360. *Australian/New Zeland*, 2004)

Table. Risk Assessment

Process	Hazard	Risk	Level		
			Likelihood	Severity	Risk Rate
Preparing CNG gas	Noise	Difficulty in communication, hearing loss	One	Two	Two
	Temperature	Tired, pounding, sweating, difficulty in urination, thirst, stress due to heat	One	Two	Two
Turning on the machine	Noise	Difficulty in communication, hearing loss	One	Two	Two
	Temperature	Tired, pounding, sweating, difficulty in urination, thirst, stress due to heat	Two	Two	Two
Monitoring boiler andcompressor	Noise	Difficulty in communication, hearing loss	Three	Two	Six

Risk control

Once the potential hazards, their level, and categories of risk evaluation were found, the risk control took over the process. According to the concept of ALARP (As Long As Reasonably Practicable), it is necessary to immediately determine control measures so that the risks do not have an excessively negative impact on workers and corporations. Control measures can be done by reducing severity, likelihood and risk transfer, as well as avoiding risks. The company used the risk control for engineering, administration, and Personal Protective Equipment (PPE).

Table 8. Risk control

Process	Hazard	Risk	Level	Existing control	Value Control
Preparing CNG gas	Noise	Difficulty in communication, hearing loss	Two	- Engine maintenance - Earplug - Engine reducer - Fit to work - Ventilation - SOP - Work environment measurement - Rest - Safety talk	75 % (Well implemented)
	Temperature	Tired, pounding, sweating, difficulty in urination, thirst, stress due to heat	Two	- PPE - Fit to work - Safety talk - Ventilation - SOP - Work environment measurement - Rest - Supply of mineral water	75 % (Well implemented)
Turning on the machine	Noise	Difficulty in communication, hearing loss	Two	- -Engine maintenance - Earplug - Engine Reducer - Fit to work - Ventilation - SOP - Work environment measurement - Rest - Safety talk	75 % (Well implemented k)
	Temperature	Tired, pounding, sweating, difficulty in urination, thirst, stress due to heat	Two	- PPE - Fit to work - Safety talk - Ventilation - SOP - Work environment measurement - Rest - Supply of mineral water	75 % (Well implemented)
Monitoring boiler and	Noise	Difficulty in communication,	Six	- Engine maintenance	75 % (Well

Process	Hazard	Risk	Level	Existing control	Value Control
compressor		hearing loss		- Earplug - Engine reducer - Fit to work - Ventilation - SOP - Work environment measurement - Rest - Safety talk	impleme nted)
	Temperatur e	Tired, pounding, sweating, difficulty in urination, thirst, stress due to heat	Two	- PPE - Fit to work - Safety talk - Ventilation - SOP - Work environment measurement - Rest - Supply of mineral water	75 % (Well impleme nted)

Residual risk

Residual risk persists after control measures are performed. The residual risk assessment is crucial to identify the level of risk that is still acceptable as the basis of control improvements and subsequent repair action.

According to Tualeka (2013), the residual risk formula is as follows:

$$\frac{(100\% - \%\ \text{control value}) \times \text{risk}}{100\ \%}$$

The utility area in X Ltd., Lubricant Production Unit Gresik had no residual risk at most of the working stages.

Table 9. Residual risk.

Process	Hazard	Residual risk
Preparing CNG gas	Noise	0.5 (no risk)
	Temperature	0.5 (no risk)
Turning on the machine	Noise	0.5 (no risk)
	Temperature	0.5 (no risk)
Monitoring boiler and compressor	Noise	1.5 (low risk)
	Temperature	0.5 (no risk)

DISCUSSION

Evaluation of health risk assessment in the utility area

Risk assessment evaluates the likelihood and severity (magnitude) of positive and negative environmental impacts as a result of exposure to one or more hazards (ISO 31000, 2009). This assessment identifies health hazards and assesses health risks that can result in health problems and occupational diseases. Such the assessment is conducted based on a joint discussion between engineers, occupational health and hygiene practitioners, and operational staff. It consists of hazard identification, risk assessment, risk control, and residual risk assessment.

The production area is where the production support machine is operated. This machine can cause noise, high temperature, and exposure to chemicals resulting from the emission of machine operation. However, based on the secondary data, the chemicals in the utility area were still below the threshold evaluation system, meaning it is still relatively safe. The company had not done a health risk assessment and measured the level of noise and temperature.

Suma'mur (2009) defined noise as an unwanted sound from a production tool or a work tool that can cause hearing loss. Noise can also result in impaired concentration and mental disorders, such as difficulty in communicate and sleep disorders.

This was in line with Prima Fithri (2015) which found that the utility area of Pertamina RU II Dumai Ltd. had the intensity of noise higher than the threshold evaluation system due to the non-stop production process that affects hearing. In this present study, noise is from engine boiler, compressor, reserve osmosis, condensate tank, cooling tower, condensate tank, cooling tower, condensate cooler, air dryer, and diesel engine generator. Exposure to noise may result in changes in hair cell cilia of the Corti organs. A long-lasting noise can break the Stereocilia and cause scarring due to the widespread of broken cells. One precautionary attempt to prevent hearing loss and monitor the environment is by measuring noise.

Moreover, high temperature could impact on heatstroke leading to death. Symptoms of heatstroke include central nervous system dysfunction, disorientation, nausea, vomiting, tachycardia, and tachypnea. The possible complications are kidney failure, liver failure, rhabdomyolysis, and high temperature of more than 40 ^{o}C. Similarly, Bourney (2015) found 20 oil and gas workers passed away due to heatstrokes.

Based on the observation, the workers also got exposed to sunlight or outdoor environment and heat from the machine production. The results of interviews with the workers, HSE supervisor, and HSE officers showed the company had not done medical check-up to determine the health condition of their workers affected by the working environment. The medical check-up consists of physical examinations, auxiliary checks, and additional checks on potential hazards. Physical examination involves blood pressure, pulse, temperature, respiration, and body mass index. Supporting examination includes the chest X-ray examination, heart record, fasting blood sugar, Hb, and urine. Additional tests on the potential hazards include audiometric examination, spirometry, color blind test, narcotics treadmill, biological monitoring, visual acuity test, and fitness test. The company only conducted a fit-to-work test before work.

The health risk of the company was categorized low in that the workers were not exposed continuously for 8 hours to noise, engine's temperature, and sunlight in outdoor. The workers did not complain of difficulty in urination, thirst, tiredness, and difficulty in communication. Additionally, the noise and temperature did

not result in the increased blood pressure and pulse. This went in the same way as Soeripto (2008) which found the pulse was under 110 beats/minute and did not change after 1 minute of rest, meaning the work environment is safe. According to OHSAS 18001, the low risk category is necessary for supervision to improve the effectiveness of risk control. Based on the interview, the workers still did not use PPE and take fit-to-work test. To reduce hazards, the measurement of noise and temperature is required.

Noise pollution is from a boiler machine, compressor, reserve osmosis, condensate tank, cooling tower, condensate tank, cooling tower, condensate cooler, air dryer, and diesel engine generator. In the boiler and compressor monitoring stage, the noise is intermittent with more than 6 dbA. The machine that emits intermittent noise is a compressor, and thus the machine maintenance can be done to reduce risks. Moreover, it is required to supervise the use of PPE to prevent health disorders.

The risk control is a decisive step in overall risk management. Control measures that can be done are reducing the likelihood, severity, partial or entire risk transfer, and risk prevention (Ramli, 2010). The company had applied some engineering control, such as reducing engine, maintaining the machine annually, and setting a ventilation. In terms of administrative measures, they arranged SOP, fit to work test, break time, and work rotation, as well as providing mineral water and safety talk. The company provided the standard PPE including a helmet, gloves, and safety shoes. Besides, they gave an earplugs, earmuff, mask, and glasses.

The control risk in the company was good, but there were still gaps. For instance, the workers sometimes did not use earplugs, and the measurement of noise and temperature in the area was not conducted. The workers also did not take any fit-to-work test regularlyAs a result, they suffered from hearing loss. The residual risk assessment showed the working stages mostly had no risk except the boiler and compressor monitoring stage with low risk. (Siswanto, 2009) explained acceptable risks are those within the secure limits and need supervision to improve the effectiveness of risk control. Promoting the use of PPE and fit-to-work test is necessary to avoid the potential hazards in the utility area.

CONCLUSION

The most common occupational diseases in the utility area at the X Lubricant Production Unit Limited Liability Company, Gresik were hearing impairment and difficulty in communication resulting from noise. Based on the health risk assessment, the utility area had low risk in the majority of the working stages. In general, cthe risk control was implemented well, but the use of PPE, fit-to-work test, measurement of temperature and noise were still lacking. The residual risk assessment showed the majority of the working stages did not have any risk except in the boiler and compressor monitoring which had the low risk.

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