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REKOMENDASI PERSETUJUAN ETIK

Nomor : **5242/UN4.14.1/TP.01.02/2021**

Tanggal : 10 Mei 2021

Dengan ini Menyatakan bahwa Protokol dan Dokumen yang Berhubungan dengan Protokol berikut ini telah mendapatkan Persetujuan Etik :

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Peneliti Utama	1. Nurul Mawaddah Syafitri 2. Dr. Lalu Muhammad Saleh, SKM, MKes	Sponsor	Pribadi
Judul Peneliti	Sketsa Keselamatan dan Kesehatan Kerja Karyawan Apron di Bandara Sultan Hasanuddin Makassar		
No.Versi Protokol	1	Tanggal Versi	22 Maret 2021
No.Versi PSP	1	Tanggal Versi	22 Maret 2021
Tempat Penelitian	PT Gapura Angkasa Bandara Sultan Hasanuddin Makassar		
Judul Review	<input type="checkbox"/> Exempted <input checked="" type="checkbox"/> Expedited <input type="checkbox"/> Fullboard	Masa Berlaku 10 Mei 2021 Sampai 10 Mei 2022	Frekuensi review lanjutan
Ketua Komisi Etik Penelitian	Nama : Prof.dr.Veni Hadju,M.Sc,Ph.D	Tanda tangan 	Tanggal 10 Mei 2021
Sekretaris Komisi Etik Penelitian	Nama : Dr. Wahiduddin, SKM, MKes	Tanda tangan 	Tanggal 10 Mei 2021

Kewajiban Peneliti Utama :

1. Menyerahkan Amandemen Protokol untuk persetujuan sebelum di implementasikan
2. Menyerahkan Laporan SAE ke Komisi Etik dalam 24 Jam dan dilengkapi dalam 7 hari dan Laporan SUSAR dalam 72 Jam setelah Peneliti Utama menerima laporan
3. Menyerahkan Laporan Kemajuan (progress report) setiap 6 bulan untuk penelitian resiko tinggi dan setiap setahun untuk penelitian resiko rendah
4. Menyerahkan laporan akhir setelah Penelitian berakhir
5. Melaporkan penyimpangan dari protokol yang disetujui (protocol deviation/violation)
6. Mematuhi semua peraturan yang ditentukan

NOISE MAPPING AND HEALTH PROBLEMS OF APRON EMPLOYEES PT GAPURA ANGKASA IN INTERNATIONAL AIRPORT SULTAN HASANUDDIN MAKASSAR

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Birawida⁵, Darmawansyah⁶

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ABSTRACT

Workers, as human resources, require specific consideration in terms of their competencies, safety, and occupational health. Workers are exposed to the risks of accidents and occupational diseases as a result of a mix of factors, including the workforce and the work environment. The purpose of this study is to describe environmental characteristics and occupational health among Apron personnel at Sultan Hasanuddin International Airport Makassar, who work for PT. Gapura Angkasa. In May-June 2021, it will be held at Sultan Hasanuddin International Airport Makassar. This study takes a quantitative approach and using descriptive research methods. This study used an incidental sampling strategy to choose a sample of 67 employees. For the univariate analysis test, the SPSS 23 application was employed, and for noise mapping, the Soundplan 8.2 application was used. The findings show that some environmental elements, such as noise and work climate, have measurement values that are higher than the threshold value. Hearing issues, elevated pulse and oxygen levels in the body, and the measurement of worker characteristics (age, educational status, duration of employment, years of service, BMI, and use of personal protection equipment) that can affect employee safety and health PT. Gapura Angkasa's apron at Makassar's Sultan Hasanuddin International Airport. It is intended that PT Gapura Angkasa will increase worker supervision while on Apron so that personnel can follow protocols and be disciplined when using personal safety equipment.

Keywords: Occupational Safety and Health, noise, health problems, worker factors, apron employees.

I. INTRODUCTION

Manpower is a human resource that plays an important role in the industrial development process [1]. Therefore, human resources, namely workers, need special attention in terms of their abilities, safety, and occupational health. The hazards faced by the workforce are the dangers of accidents and occupational diseases, due to a combination of various factors, namely workforce and the work environment. According to data from the International Labor Organization, every year there are more than 250 million accidents in the workplace and more than 160 million workers become ill due to hazards in the workplace [2].

Apron has to park aircraft, drop off and pick up passengers, cargo, post, refuel, and perform aircraft maintenance and upkeep as one of the sides of the air or a space at the airport [3]. Starting with the work procedure, work tools, and work environment, Apron employees are exposed to a significant risk of harm. The work environment in this section should be a source of worry because the level of noise is rather high, necessitating precautions to protect workers from health concerns caused by noise. Apart from the noise consequences, the Apron area is also an outdoor work place, exposing workers to heat stress as a result of the work temperature or weather [4]. This,

of course, adds to the workload for Apron people in the workplace. Heat stress, which is caused by a heated working environment, can cause physiological changes known as heat strain [5].

In 2015-2017, the European Aviation Safety Agency did a safety analysis on ground handling, and the top three safety concerns were the high risk of mishaps due to the baggage and cargo loading process, Apron staff environmental conditions, and employee performance [6]. This indicates that the job method, work environment, and personal aspects of Apron employees have an impact on their occupational safety and health. When it comes to safety, it has an impact on worker productivity [7].

PT. Garuda Indonesia is one of the corporations that regulates the ground handling section at the Makassar Sultan Hasanuddin airport, one of which is the line site section, also known as the Apron. The strong demand for air travel or aircraft has an impact on the density of traffic at the airport. This situation is akin to Apron employees' increased need for work. As a result, the purpose of this research is to describe environmental characteristics and occupational health among Apron personnel at Sultan Hasanuddin International Airport Makassar.

II. METHODS

A descriptive survey was used to perform this research. Airbus 330-300, Boeing 737, and ATR PK-GAM are three of the three types of aircraft surveyed that have airplane parking spots. The study took place at Makassar's Sultan Hasanuddin International Airport. From May through June 2021, data will be collected. The employees of PT Garuda Indonesia apron who worked on the surveyed aircraft made up the study's sample. With a sample size of 67 participants, the sampling technique employed in this study was incidental sampling. The data collecting method begins with a sound level meter and a heat stress monitor measuring noise and hot working climate (environmental factors), a tuning fork assessing hearing power, and finger pulses monitoring pulse and oxygen in the body before and after employees work. oximeter (health factor) and worker factors (age, length of employment, years of service, BMI, and use of personal protective equipment) were gathered by a questionnaire. SPSS 23 and Microsoft Excel, as well as Soundplan 8.2, were used to analyze the data.

III. RESULTS

Based on the results of data collection carried out, the following results were found:

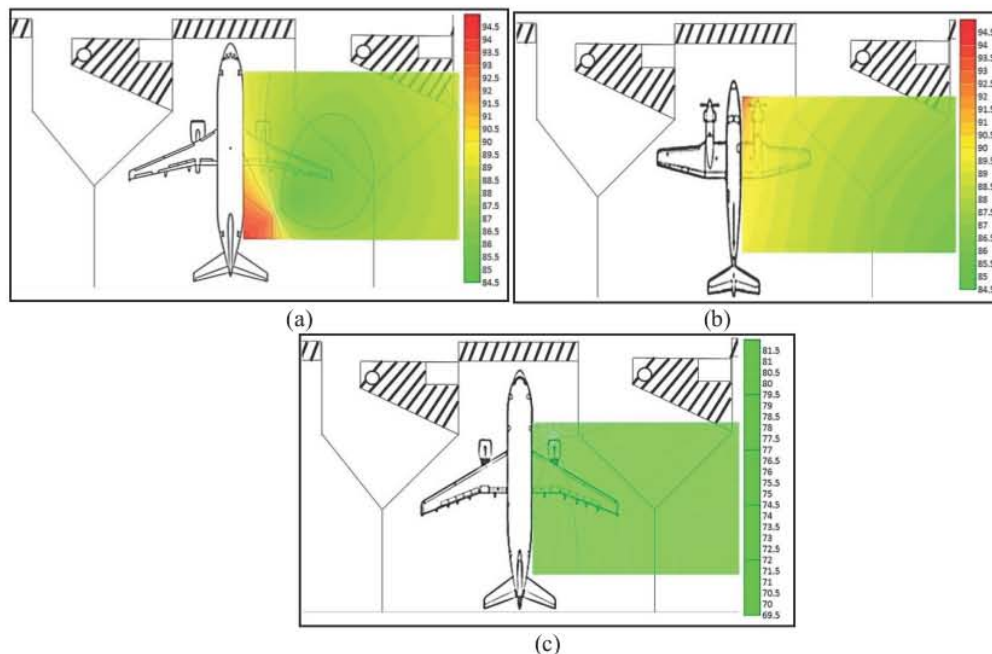


Figure 1. Map description of the measurement results of work environment noise in the Apron area on (a) Boeing 737 aircraft, (b) PK-GAM ATR aircraft, and (c) Airbus 330-300 aircraft

The respondent's work area was used to take measurements. According to Figure 1, the Boeing 737 and the PK-GAM ATR aircraft types are the ones that cause the most noise pollution. It is demonstrated by the presence of a point with a noise level exceeding the allowed threshold of 85 dB, as defined by Ministry of Manpower Regulation No. 5 Years 2018 [8]. The noise level produced by the Airbus 330-300 is classified as safe or below the threshold value (Figure 1).

Table 1. Results of Measurement of Hot Work Climate of PT Gapura Angkasa Apron Employees at Sultan Hasanuddin Airport Makassar

Sampling Hours	Temperature (°C)			WBGT (°C)
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10.10-10.22	32,9	27,6	43,8	30,7
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15.10-15.22	33,1	26,1	34,7	28,5
WBGT average				29,9

Source: Primary Data, 2021

The average ISBB value was discovered to be 29.9°C, with the highest ISBB details being found in the morning around 10.10-10.22 AM, which is 30.7°C. Then at 12:10-12:22 PM, which is 30.5°C, in the afternoon. The ISBB was measured at 28.5°C in the afternoon at 15.10-15.22 PM (Table 1).

Table 2. Distribution of Respondents Based on Health Factors of PT Gapura Angkasa Apron Employees at Sultan Hasanuddin Airport Makassar

Variable	n	%
Hearing Loss (Rinne's Test)		
Negative Rinne (There is hearing loss)	12	17,9
Rinne Positive (No hearing loss)	55	82,1
Pulse Change		
Improved after work	62	92,5
Decrease after work	5	7,5
Changes in Oxygen in the body		
There are changes	5	7,5
No changes	62	92,5

Source: Primary Data, 2021

The findings of the health factor measurement revealed that 12 people (17.9%) had hearing loss, 62 people (92.5%) had an increase in pulse before and after work, and only 5 people (7.5%) had changes in oxygen in the body before and after work (Table 2).

Table 3. Distribution of Respondents Based on Worker Factors of PT Gapura Angkasa Apron Employees at Sultan Hasanuddin Airport Makassar

Variable	n	%
Age		
46-55	7	10,4
36-45	11	16,4
26-35	25	36,3
17-25	24	35,8
Last Education		
Primary School	0	0,0
Junior High School	0	0,0
Senior High School	62	92,5
S1	5	7,5
Years of Service		
Long	39	58,2
New	28	41,8
Length of Work		
Not eligible	60	89,6
Qualify	7	10,4

Body mass index		
Underweight	8	11,9
Obesity	21	31,3
Normal	38	56,7
Use of PPE		
Yes, incomplete	60	89,6
Yes, complete	7	10,4

Source: Primary Data, 2021

Various elements, particularly the respondents' attributes, have an impact on worker performance. Based on the measured characteristics, it was discovered that the majority of respondents were between the ages of 26 and 35, with 25 people (36.3 percent) and 62 people respectively (92.5%). Then there are 39 people (58.2%) who have a long working period, and 60 people (89.6%) who do not fulfill the requirements since their employment is more than 8 hours long, according to the guidelines. The results of BMI measures were also discovered and collected, with 8 people (11.9%) classed as underweight and 21 people (31.3%) classified as obese. A total of 60 people (89.6%) utilize personal protective equipment but do not wear it completely (Table 3).

IV. DISCUSSION

Occupational safety and health can be influenced by a variety of factors in the workplace, including environmental factors, work procedures, and the workers themselves. Environmental considerations are circumstances that must be taken into account when ensuring employee safety and health. Employee productivity might be hampered and morale can suffer as a result of the dangers that come with an unmanaged environment. This implies that the workplace has a significant impact on employee performance, morale, and productivity [9].

The average noise level created in the Apron Bandar area of Sultan Thaha Airport, Jambi City, was 91.4 dB, according to a research. Furthermore, informants who operate in the apron area indicated that the noise in the apron is caused by the aircraft engine, which is used for both takeoff and landing activities [10]. Another study conducted at Iswahjudi Air Base's 3rd Air Squadron yielded a noise level of 95.56 dB, with the high noise level resulting from engine testing, takeoff, and landing activities [11]. Unless there is a new airplane engine product that can be hushed so that the sound produced is smaller, noise in the Apron area will continue to exist. Then there's worker compliance with using ear protection to limit the chance of exposure.

Because it has numerous impacts when exposed to a hot climate, a hot working climate is included in environmental concerns that might affect the safety and health of Apron employees. Overexposure to environmental heat can cause major health problems in both healthy and sick people, ranging from mild illness to death [12]. According to other studies, the consequences of a hot working climate might include dehydration, weariness, dizziness, disorientation, impaired brain function, loss of attention, and discomfort among outdoor workers [13].

Hearing loss was discovered among the responders, according to the statistics. This can happen if there aren't enough employees who wear ear protection while working. Based on the findings of prior research on the degree of noise and the type of deafness, the statistical test (*Chi-Square*) revealed that there is a significant link between the degree of noise and the type of deafness, with a *p* value of (0.000). This demonstrates that a noisy workplace has the potential to cause workers to go deaf [14]. Apron personnel at PT Gapura Angkasa Airport Sultan Hasanuddin Makassar experience not only hearing loss, but also changes in heart rate and oxygen levels in the body before and after work. Changes in heart rate and oxygen levels in the body can be caused by environmental factors such as noise and the work environment. This is due to the fact that environmental stresses can excite the autonomic and endocrine nervous systems, causing homeostasis to be disrupted and resulting in a variety of health issues [15].

Environmental factors that can lead to a variety of health issues are also influenced by the body's resilience and human behavior. Workers' personal factors can be characterized as a condition or set of traits that can have an impact on their safety and health, such as physical capacities, mental abilities, and individual perceptions.

Various characteristic circumstances were discovered based on the study's findings, including variables such as age, length of employment, years of service, educational status, BMI, and PPE using habit. One of the variables that greatly promotes the achievement of K3 in the workplace is the worker component in the aspect of Occupational Safety and Health. Several studies have been conducted throughout the years to investigate the

association between various forms of occupational accidents, categorized by severity and near misses. As a result, human error is responsible for 90% of all workplace accidents, implying that the worker element is the most important factor in most workplace mishaps [16]. Furthermore, workers whose health is harmed as a result of accidents, injuries, disability, or illness can disturb the smooth operation of their jobs, lowering productivity and hurting their competitiveness. Furthermore, people with poor health risk endangering their coworkers or the workplace environment [17].

The study's conclusion is that there are several environmental elements, such as noise and work climate, that have measurement values that are higher than the threshold value. Hearing issues, elevated pulse and oxygen levels in the body, and worker parameters (age, educational status, duration of employment, years of service, body mass index, and use of personal protection equipment) that can affect employee safety and health are all factors to consider. PT. Gapura Angkasa's apron at Makassar's Sultan Hasanuddin International Airport. As a result, continual prevention is required in the framework of preventing work accidents and occupational disorders [18]. It is hoped that PT Gapura Angkasa can increase worker supervision while on Apron, so that personnel can follow protocols and maintain discipline when using personal safety equipment.

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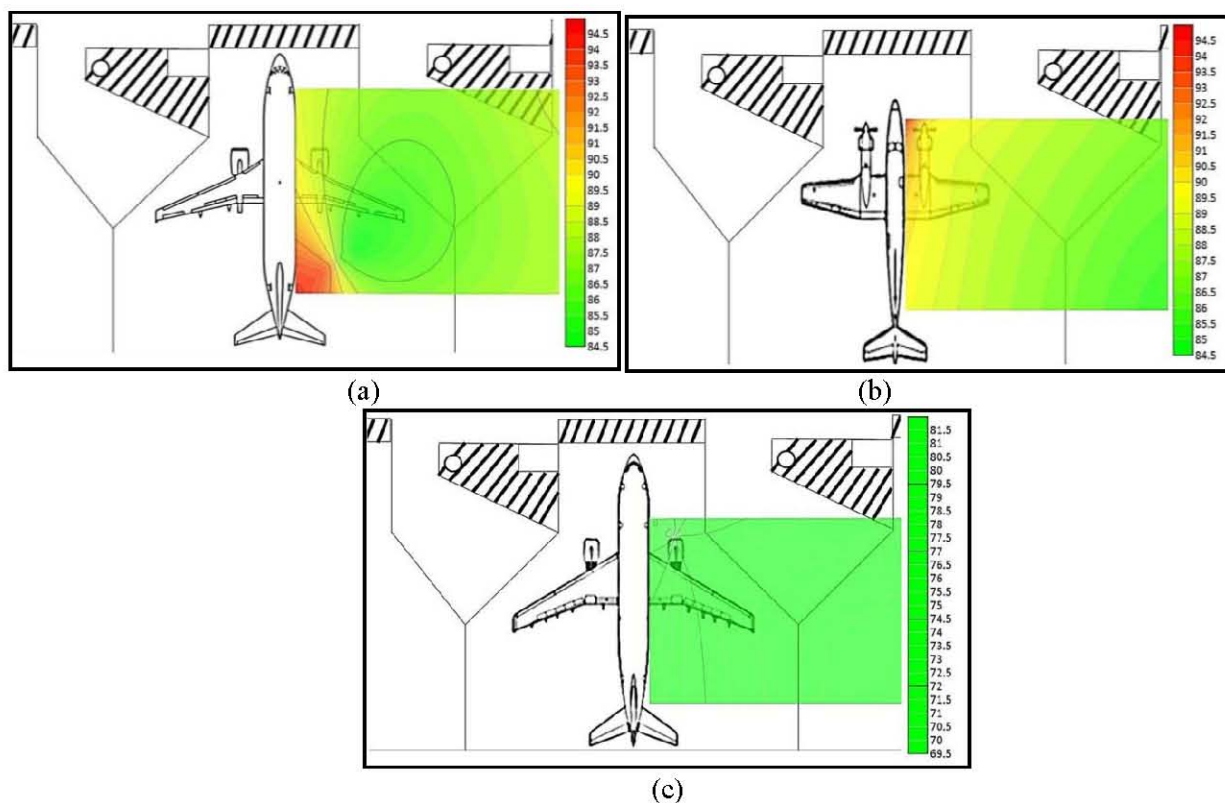


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New	28	41,8
Length of Work		
Not eligible	60	89,6
Qualify	7	10,4

Body mass index		
Underweight	8	11,9
Obesity	21	31,3
Normal	38	56,7
Use of PPE		
Yes, incomplete	60	89,6
Yes, complete	7	10,4

Source: Primary Data, 2021

Various elements, particularly the respondents' attributes, have an impact on worker performance. Based on the measured characteristics, it was discovered that the majority of respondents were between the ages of 26 and 35, with 25 people (36.3 percent) and 62 people respectively (92.5%). Then there are 39 people (58.2%) who have a long working period, and 60 people (89.6%) who do not fulfill the requirements since their employment is more than 8 hours long, according to the guidelines. The results of BMI measures were also discovered and collected, with 8 people (11.9%) classed as underweight and 21 people (31.3%) classified as obese. A total of 60 people (89.6%) utilize personal protective equipment but do not wear it completely (Table 3).

IV. DISCUSSION

Occupational safety and health can be influenced by a variety of factors in the workplace, including environmental factors, work procedures, and the workers themselves. Environmental considerations are circumstances that must be taken into account when ensuring employee safety and health. Employee productivity might be hampered and morale can suffer as a result of the dangers that come with an unmanaged environment. This implies that the workplace has a significant impact on employee performance, morale, and productivity [9].

The average noise level created in the Apron Bandar area of Sultan Thaha Airport, Jambi City, was 91.4 dB, according to a research. Furthermore, informants who operate in the apron area indicated that the noise in the apron is caused by the aircraft engine, which is used for both takeoff and landing activities [10]. Another study conducted at Iswahjudi Air Base's 3rd Air Squadron yielded a noise level of 95.56 dB, with the high noise level resulting from engine testing, takeoff, and landing activities [11]. Unless there is a new airplane engine product that can be hushed so that the sound produced is smaller, noise in the Apron area will continue to exist. Then there's worker compliance with using ear protection to limit the chance of exposure.

Because it has numerous impacts when exposed to a hot climate, a hot working climate is included in environmental concerns that might affect the safety and health of Apron employees. Overexposure to environmental heat can cause major health problems in both healthy and sick people, ranging from mild illness to death [12]. According to other studies, the consequences of a hot working climate might include dehydration, weariness, dizziness, disorientation, impaired brain function, loss of attention, and discomfort among outdoor workers [13].

Hearing loss was discovered among the responders, according to the statistics. This can happen if there aren't enough employees who wear ear protection while working. Based on the findings of prior research on the degree of noise and the type of deafness, the statistical test (*Chi-Square*) revealed that there is a significant link between the degree of noise and the type of deafness, with a *p value* of (0.000). This demonstrates that a noisy workplace has the potential to cause workers to go deaf [14]. Apron personnel at PT Gapura Angkasa Airport Sultan Hasanuddin Makassar experience not only hearing loss, but also changes in heart rate and oxygen levels in the body before and after work. Changes in heart rate and oxygen levels in the body can be caused by environmental factors such as noise and the work environment. This is due to the fact that environmental stresses can excite the autonomic and endocrine nervous systems, causing homeostasis to be disrupted and resulting in a variety of health issues [15].

Environmental factors that can lead to a variety of health issues are also influenced by the body's resilience and human behavior. Workers' personal factors can be characterized as a condition or set of traits that can have an impact on their safety and health, such as physical capacities, mental abilities, and individual perceptions.

Various characteristic circumstances were discovered based on the study's findings, including variables such as age, length of employment, years of service, educational status, BMI, and PPE using habit. One of the variables that greatly promotes the achievement of K3 in the workplace is the worker component in the aspect of Occupational Safety and Health. Several studies have been conducted throughout the years to investigate the

association between various forms of occupational accidents, categorized by severity and near misses. As a result, human error is responsible for 90% of all workplace accidents, implying that the worker element is the most important factor in most workplace mishaps [16]. Furthermore, workers whose health is harmed as a result of accidents, injuries, disability, or illness can disturb the smooth operation of their jobs, lowering productivity and hurting their competitiveness. Furthermore, people with poor health risk endangering their coworkers or the workplace environment [17].

The study's conclusion is that there are several environmental elements, such as noise and work climate, that have measurement values that are higher than the threshold value. Hearing issues, elevated pulse and oxygen levels in the body, and worker parameters (age, educational status, duration of employment, years of service, body mass index, and use of personal protection equipment) that can affect employee safety and health are all factors to consider. PT. Gapura Angkasa's apron at Makassar's Sultan Hasanuddin International Airport. As a result, continual prevention is required in the framework of preventing work accidents and occupational disorders [18]. It is hoped that PT Gapura Angkasa can increase worker supervision while on Apron, so that personnel can follow protocols and maintain discipline when using personal safety equipment.

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