Analysis of environmental ergonomic factors in the wonogiri white brem industrial center

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Abstract. White Brem is a traditional food originating from Wonogiri Regency. The white brem production center is located in Gebang Village, Nguntoronadi District, Wonogiri Regency, Central Java Province. In this village, white brem has been produced since 1930. The skill of making white brem has been passed down from generation to generation using traditional production facilities and methods. Currently, there are around 20 white brem producers in Gebang Village. It can be said that white brem is one of the pillars of the Gebang Village economy. The purpose of this study is to produce an analysis of environmental ergonomic factors, namely temperature, light intensity, humidity, and noise in the white brem industrial center. Environmental ergonomic factors significantly influence work productivity. This study used a sample of 10 business units. Environmental ergonomic factor data were observed on 9 different days, in 2 production rooms (cooking room and molding room), and at 3 observation times (morning, afternoon, and evening). The measurement results were compared with threshold values in accordance with government regulations regarding work environment conditions. Further analysis was conducted to test whether there were significant differences in environmental ergonomic factors in the 2 production rooms and 3 work periods.. The results of data processing indicate that most of the working environment conditions in the brem industrial center in Gebang Village, Nguntoronadi District, Wonogiri Regency, Indonesia do not meet environmental ergonomic standards, especially in the aspects of temperature, humidity, and light intensity. Comparison with the threshold values according to government regulations shows that: (1) for the temperature and humidity variable, all business units do not meet the threshold value; (2) for the lighting variable, 40% of the cooking room and 30% of the printing room meet the threshold value; and (3) for the noise variable, all business units meet the threshold value. The Kruskal Wallis test shows that there are significant differences in temperature and humidity variables at three working periods. This is a top priority that requires improvement. This paper can be use as a database in conducting ergonomic interventions in the white brem industrial center in Gebang Village

Keyword: environmental ergonomic, white brem, producers, threshold value

1. Introduction

White brem is a traditional food from Wonogiri Regency, Central Java Province, Indonesia. White brem has distinctive characteristics that distinguish it from brem from other regions: it is white in color, thin, round, sweet, dissolves quickly, has a sweet and fresh taste, and has a cooling sensation. The raw material for white brem is white glutinous rice processed through a fermentation process. After fermentation is complete, the resulting brem is dried. The drying process serves to reduce the water content and extend the product's shelf life. This drying process also helps concentrate the flavor and aroma of brem (Setiarto et al., 2024). The final process is packaging to maintain product quality (Qureshi et al., 2024; Sarma et al., 2023), and increase consumer appeal (Omidiran et al., 2024), so that this product is ready for marketing. White brem is marketed in the Solo Raya area and its surroundings, such as Sukoharjo, Surakarta, Karanganyar, Klaten, Yogyakarta, and Pacitan Regency.

Wonogiri's white brem business is centered in Gebang Village, Nguntoronadi District. There are 20 white brem producers in this village, making Gebang Village a center for white brem production and distribution. Production has been running since 1930, and brem-making skills have been passed down through generations. The brem business has become an economic pillar of Gebang Village, as its production and marketing activities absorb local labor, both within the family and the surrounding community. This has significantly contributed to improving the welfare of the village community and strengthening Wonogiri's cultural identity as a region producing traditional white brem. Brem production still uses traditional equipment and production facilities, thus preserving Wonogiri's traditional culinary culture. According to research by Wardani & Dewi (2025), white brem is included in the cluster of superior processed regional foods in Wonogiri Regency.

As a traditional business unit, environmental ergonomics have not been considered in production activities. Environmental ergonomics relates to how humans interact with their surroundings, focusing on lighting, temperature, noise, humidity, and vibration to optimize safety and system performance (K. C. Parsons, 2000). Environmental ergonomics significantly impact work productivity (Bariyah et al., 2024). The application of sound ergonomic principles in workplace design can improve worker well-being and overall productivity (Suokko & Reiman, 2021; Chim, 2018; Gani et al., 2018). Conversely, working conditions that do not meet ergonomic standards can cause fatigue, reduce concentration (Lasin & Panicker, 2021), and increase errors in the production process (Silva et al., 2020). Abdous et al. (2025) argue that workspaces designed without considering ergonomics can cause physical discomfort and fatigue. This can impact the quality of white brem producers (Capistrano & Norona, 2020). As an industry that impacts the economy, factors affecting productivity and business sustainability, such as environmental ergonomics, are crucial (Radhwa & AL-G, 2024). Attention to factors supporting productivity will positively impact business sustainability and the preservation of Wonogiri Regency's culinary culture.

Environmental ergonomics become hazardous when the work environment's physical factors are not designed to align with human physical capabilities and limitations, leading to strain and discomfort. Lighting that is too bright or too dim can cause significant eye fatigue (Halim et al., 2024). Low humidity in the work area can cause workers to experience dry eyes, irritated skin, and respiratory problems (Razjouyan et al., 2020); while high humidity can trigger the growth of contaminants that can harm workers' health (Jones et al., 2022). High room temperatures can lead to reduced cognitive function and concentration in workers (Picchio & van Ours, 2024). High workspace temperatures can also cause discomfort, stress, and heat, reducing worker productivity (Sugiono et al., 2016). Excessive noise also causes hearing loss, stress, and communication disorders (Çakıt & Karwowski, 2024; Makhbul et al., 2022).

The government has established regulations to regulate the standard limits for these environmental ergonomic factors. According to the Decree of the Minister of Health of the

Republic of Indonesia No. 70 of 2016, the threshold values for lighting and humidity are a minimum of 200 lux and a maximum of 60%, respectively. Room humidity above 60% will cause the development of pathogenic organisms and allergenic organisms (Sohilauw et al., 2023). For temperature factors, according to the Decree of the Minister of Health No. 1405 / menkes / SK / XI / 2002, the maximum threshold value is 28°C. The threshold value for noise according to the Decree of the Minister of Manpower No. per-51 / MEN / 1999, ACGIH, 2008 and SNI 16-7063-2004, is a maximum of 85dB. These threshold value standards serve as a reference in various industrial sectors, including the White Brem industry, which is still rarely studied from an environmental ergonomics perspective. Under Law Number 11 of 2020 concerning Job Creation, companies are required to provide a safe and healthy work environment for their employees. Meeting thresholds for temperature, light, noise, and humidity is an effort to provide a safe and healthy environment for workers (Flouris et al., 2025).

Environmental ergonomics research in the Wonogiri white brem industrial center has not been found. Research conducted in the brem industrial center has included marketing analysis (Kadi et al., 2021), increasing productivity and production quality (Suseno & Wibowo, 2018), business competition strategies (Kholipah, 2022), and the impact of the white brem industry on the socio-economic life of the local community (Oktafiani, 2017). Therefore, environmental ergonomics research is crucial considering that the brem production process involves activities at high temperatures and heat exposure, which have the potential to cause health problems and reduce worker productivity (Aulia et al., 2023). Similar research in other traditional food sectors can serve as an initial reference in designing ergonomic studies for the white brem industry..

Research on environmental ergonomics in the traditional food industry has been widely conducted. Muanah et al., (2021) assessed the ergonomic conditions of a tofu production room through measurements at 10 work stations. A similar study was conducted by Caesar et al., (2021) on all stages of tofu production, covering aspects of noise, lighting, and temperature. Saka & Ushada (2023) conducted a study on environmental ergonomics at the karak producer in Gindangan Village, measuring parameters including temperature, lighting, noise, and humidity. The HIRARC and Kansei Engineering methods were also used to evaluate environmental factors and work perceptions. This correlates with the research of Wijaya & Wibowo (2024), which stated that there is a statistically significant relationship between the work environment and work stress of dodol makers in Panglatan Village. Therefore, the work environment is crucial to pay attention to in order to improve performance and productivity.

Based on the above situation, this study was conducted on environmental ergonomics in the brem putih industry. The environmental ergonomic aspects studied included temperature, noise, humidity, and lighting at three observation time. Measurements were conducted in the cooking room and molding room. This study is a descriptive quantitative research, providing an overview of the actual conditions of environmental ergonomic factors where operators work, compared to safe standard limits. The measurement data is compared with the threshold values set forth in the Ministry's Regulation and work ergonomics provisions. Through this comparison, it can be determined whether the physical environmental conditions in the Brem Putih industry have met standards or require improvement. This study focuses on identifying and measuring environmental ergonomic factors in the Brem Putih Industrial Center. The results of this study can be used as a basis for developing risk mitigation strategies and policy recommendations to create safe and comfortable working conditions.

2. Literature Review

2.1 Ergonomi Lingkungan

Environmental ergonomics is a multidisciplinary field focused on optimizing the interaction between humans and their environment to improve health, comfort, and performance.

Environmental ergonomics integrates factors such as heat, cold, noise, vibration, lighting, humidity, and air quality to assess their impact on human health, comfort, and performance (Parsons, 2025). It aims to create environments that support human well-being and efficiency by considering both physical and psychological impacts (Skilling & Munro, 2016).

Environmental ergonomics encompasses the principles and methods for measuring and representing the environment and its effects on human health, comfort, and performance. This includes human responses to heat and cold, sound, vibration, light, and air quality. The environmental ergonomics approach involves multidisciplinary analysis that combines virtual simulation and human performance analysis to support better design at various stages, from concept to user testing (Grandi et al., 2022).

Environmental ergonomics must be applied to industry and manufacturing to improve efficiency and safety in industrial work environments (Murcia et al., 2021); Hasanain, 2024). Good ergonomic design can increase productivity by reducing the potential for human error and improving work efficiency (Rizki et al., 2019). Environmental ergonomics is a broad and important field because it encompasses aspects that affect human performance. Utilizing environmental ergonomic principles can create a safer, more comfortable, and more productive work environment, while supporting environmental sustainability (Gani et al., 2018; Urassa, 2021).

2.2 Temperature

Temperature is a physical quantity that describes the degree of heat of an object. Temperature reflects the average kinetic energy of the particles in a system. Operationally, temperature is defined as the quantity measured by a thermometer when it has reached equilibrium with the system (Zhang et al., 2019). Common scales for temperature calculations include Fahrenheit, Celsius, and Kelvin. Temperature measurement is a crucial aspect in various industrial and scientific processes.

Workplace temperature significantly impacts worker productivity. There is a relationship between temperature, relative humidity, and worker productivity. A mathematical model has been developed that can predict production levels based on temperature and relative humidity values. Proper temperature regulation in the workplace can increase comfort, satisfaction, and performance (Capistrano & Norona, 2020). Therefore, considering temperature factors in workplace ergonomic design is essential to create an optimal and safe work environment.

2.3 Lighting

Lighting is the use of light sources to make places, objects, and the surrounding environment visible. Lighting affects the speed and reliability of vision and determines how objects' shapes, colors, and surface features appear. Lighting is the use of light sources, both artificial and natural, for illumination. Appropriate lighting can enhance task performance and improve the appearance of an area, as well as have positive psychological effects (Manju & Chamar, 2023). Therefore, lighting not only functions for illumination but also has a significant impact on visual performance, energy efficiency, quality of life, and environmental aesthetics.

Lighting is a key factor in workplace ergonomics, affecting worker well-being, productivity, and efficiency. Proper regulation of light intensity and uniformity is crucial to ensure good work performance and reduce health risks (Dupláková et al., 2024)..

2.4 Humidity

Humidity is the concentration of water vapor present in the air. Relative humidity is the ratio of the mass of water vapor present in a given volume of gas to the maximum amount of water vapor the gas can hold at a given temperature, expressed as a percentage. Another definition is the ratio of the partial pressure of water vapor in a mixture to the saturated vapor pressure of water at a given temperature. Humidity can be measured using various instruments such as hygrometers, psychrometers, and more complex electrical and optical instruments. Measurement methods include changes in electrical properties, mass spectrometry, and changes in the absorption of electromagnetic radiation (McLintic & Byers, 2024). Humidity affects thermal comfort and the thermal interaction between the human body and its environment (Kaynakli et al., 2014). Therefore, humidity is an important parameter that influences many aspects of the environment and health.

2.5 Noise

Noise is defined as unwanted sound that disturbs or damages the health of humans or wildlife. Major sources of noise include road traffic, trains, aircraft, industry, construction, and recreational activities (Alam et al., 2024). Noise can cause increased blood pressure, heart rate, respiratory distress, and digestive problems. Long-term exposure can lead to hypertension and ischemic heart disease. Noise can cause stress, sleep disturbances, irritability, and decreased concentration. Noise is also associated with mental health disorders such as depression and anxiety (Sanchesz & Fernández, 2014; Cai et al., 2025). Noise can disrupt communication, reduce work efficiency, and increase the risk of accidents.

This paper discusses environmental ergonomics with temperature, humidity, lighting, and noise variables. Temperature intensity refers to the severity or strength of heat in a given area (Wang et al., 2023). Humidity intensity refers to the amount of water vapor in the air at a given time and place. This plays an important role in understanding microclimate conditions and their effects on health and the environment (Grigorievsky, 2024). Light intensity refers to the amount of light received per unit area. Meanwhile, noise intensity refers to the level of noise generated by various sources such as traffic, industry, and other human activities.

2.7. Ergonomic intervention

Ergonomic intervention is an approach used to optimize human well-being and overall system performance by reducing work-related health risks. Ergonomic interventions are based on the analysis of environmental ergonomic measurements, identifying aspects that require improvement. Environmental ergonomic measurements are crucial because they relate to worker health, safety, and productivity (Hannan Bin Azhar et al., 2020). Ergonomic interventions aim to protect human resources and prevent work-related health risks (Rostami et al., 2022).

Ergonomic interventions bring innovative approaches to workplace risk management models and practices. Ergonomic interventions that improve employee performance can result in better quality and reduce operator errors. Ergonomic intervention programs involving training, worker participation, and work area redesign have proven effective in improving worker health and system productivity (Krishnanmoorthy et al., 2020).

3. Methods

3.1. Research Object

The object of this study is the environmental ergonomic factors in the white brem industrial center in Gebang Village, Nguntoronadi District, Wonogiri Regency, Central Java Province. The population consisted of 20 business units. This study took a sample of 10 business units. The sample selection used purposive sampling (non-probability sampling) by selecting business units based on their production continuity. The business units sampled in this study produce continuously

3.2. Research Variables

The variables in this study include light intensity, temperature, humidity, and noise. These four variables were measured at three observation times: morning (8:00–10:00), afternoon (11:00–1:00), and evening (2:00–3:00). In this paper, they are sequentially stated as observation time 1

(T1), observation time 2 (T2), and observation time 3 (T3). Measurements were conducted in two production rooms, namely the cooking room and the molding room, and were conducted over 9 production days

3.3. Research stages

The data was processed to determine descriptive statistics from the collected data. Next, a comparative analysis was conducted with threshold values in accordance with government regulations. For variables that did not meet the threshold value, further analysis was conducted. A difference test was conducted to determine whether there were differences in environmental ergonomic conditions in four factors (light intensity, temperature, humidity, and noise) at three observation times T1, T2, and T3. Finally, the environmental conditions of the brem industry center were concluded based on the data findings..

4. Result and Discussion

4.1. Data

Measurement data from 10 business units (BU) during three working periods (T1, T2, and T3) in two production rooms are summarized in the form of average values to facilitate comparison and further statistical analysis. A summary of the average measurement values is shown in Tables 4.1 to 4.4

Table 1. Average temperature (°C)

No	Business Unit	N Total	Cooking Room			Molding Room		
			T1	T2	T3	T1	T2	T3
1	BU 1	54	32,32	34,69	34,24	31,50	33,40	33,51
2	BU 2	54	32,47	34,58	34,36	30,47	32,52	33,64
3	BU 3	54	32,03	34,58	33,96	30,89	33,19	33,62
4	BU 4	54	31,90	33,77	33,79	31,19	33,20	32,68
5	BU 5	54	32,08	33,90	34,10	31,34	32,72	32,79
6	BU 6	54	30,56	33,16	33,76	30,44	32,14	32,98
7	BU 7	54	30,49	33,20	33,87	30,36	32,60	33,10
8	BU 8	54	31,67	33,32	34,03	28,32	32,98	33,19
9	BU 9	54	30,39	33,10	33,28	29,99	32,37	32,38
10	BU 10	54	30,51	33,23	33,86	29,98	32,52	32,68

Table 2. Average humidity (%)

No	Business Unit	N Total	Cooking Room			Molding Room		
			T1	T2	T3	T1	T2	T3
1	BU 1	54	65,33	55,97	61,33	66,78	58,08	61,22
2	BU 2	54	63,89	56,08	57,89	68,00	59,08	59,00
3	BU 3	54	64,78	59,30	60,00	67,22	58,41	59,56
4	BU 4	54	65,22	59,30	61,22	64,67	62,22	62,56
5	BU 5	54	64,89	57,63	59,89	65,33	58,97	60,11
6	BU 6	54	68,89	59,97	60,33	67,44	61,19	58,44
7	BU 7	54	69,11	60,30	64,11	68,67	60,41	61,11
8	BU 8	54	68,00	60,86	59,44	67,44	61,41	61,56
9	BU 9	54	69,89	60,63	65,67	69,44	61,52	65,33
10	BU 10	54	70,67	60,63	64,22	68,56	60,74	61,22

Table 3. Average light intensity (lux)

No	Business Unit	N Total	Cooking Room			Molding Room		
			T1	T2	T3	T1	T2	T3
1	BU 1	54	175,67	210,11	224,11	179,44	178,11	184,67
2	BU 2	54	195,22	254,89	279,67	230,33	282,22	348,89
3	BU 3	54	219,22	319,11	278,22	187,22	295,00	264,11
4	BU 4	54	146,78	189,44	211,44	183,22	241,67	211,33
5	BU 5	54	151,22	211,78	224,56	142,67	188,56	192,44
6	BU 6	54	429,44	451,00	432,44	188,00	165,11	174,56
7	BU 7	54	75,11	97,67	102,67	45,89	61,67	73,44
8	BU 8	54	138,33	184,89	166,67	119,44	163,11	239,67
9	BU 9	54	91,56	83,00	91,11	80,22	155,00	203,56
10	BU 10	54	91,56	83,00	91,11	80,22	155,00	203,56

Table 4. Average noise (dB)

No	Business Unit	N Total	Cooking Room			Molding Room		
			T1	T2	T3	T1	T2	T3
1	BU 1	54	40,63	38,69	37,52	42,92	43,30	41,91
2	BU 2	54	40,30	44,43	40,10	43,44	51,03	48,44
3	BU 3	54	38,19	37,19	32,67	29,77	33,48	28,48
4	BU 4	54	35,08	34,03	32,42	39,08	40,73	37,71
5	BU 5	54	29,30	33,49	32,93	31,96	35,86	32,80
6	BU 6	54	28,37	29,10	28,90	29,70	29,16	28,97
7	BU 7	54	37,63	35,58	36,92	32,84	31,19	30,78
8	BU 8	54	38,52	39,94	40,67	35,32	35,06	36,59
9	BU 9	54	34,93	33,60	34,42	32,48	33,98	33,24
10	BU 10	54	34,93	33,60	34,42	32,48	33,98	33,24

Based on Tables 4.1 to 4.4, it is known that the working environment conditions in the 10 business units show variations across all variables. The data shows that the cooking room has a temperature that tends to be higher than the molding room. Relative humidity ranges from 58% to 70%, indicating a high humidity level for the working environment. Lighting levels show significant differences between business units, with locations with low lighting below 100lux to very bright lighting above 400lux. This is influenced by the number of lamps and access to natural light in the production environment. Meanwhile, noise levels are mostly in the range of 30 to 50dB, which is considered safe for the working environment. This difference encourages a comprehensive ergonomic evaluation to ensure that the working environment remains in a normal condition, without disrupting health or work productivity.

4.2. Perbandingan dengan NAB

The assessment of the suitability of work environment conditions in 10 business units was conducted by comparing the measurement results of four variables against threshold values. The comparison is presented in graphical form in Figures 1 to 4. The graphs display the average of each variable from two production rooms (cooking room and molding room) in each business unit, then compared with the applicable threshold values.

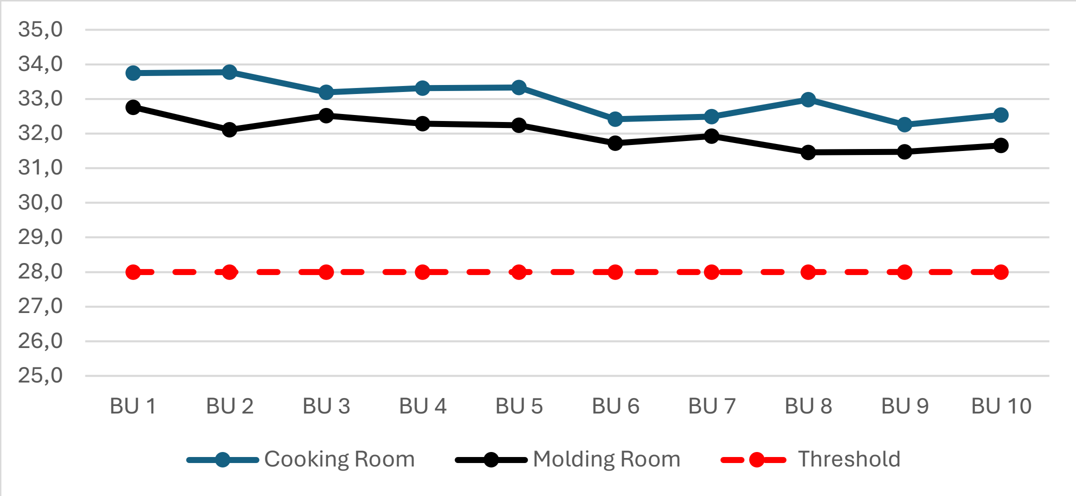

Figure 1. Comparison of average temperature in 10 businnes units with threshold value

Figure 1 shows that in both the cooking room and the molding room, all business units have temperatures above the threshold value of 28^0C

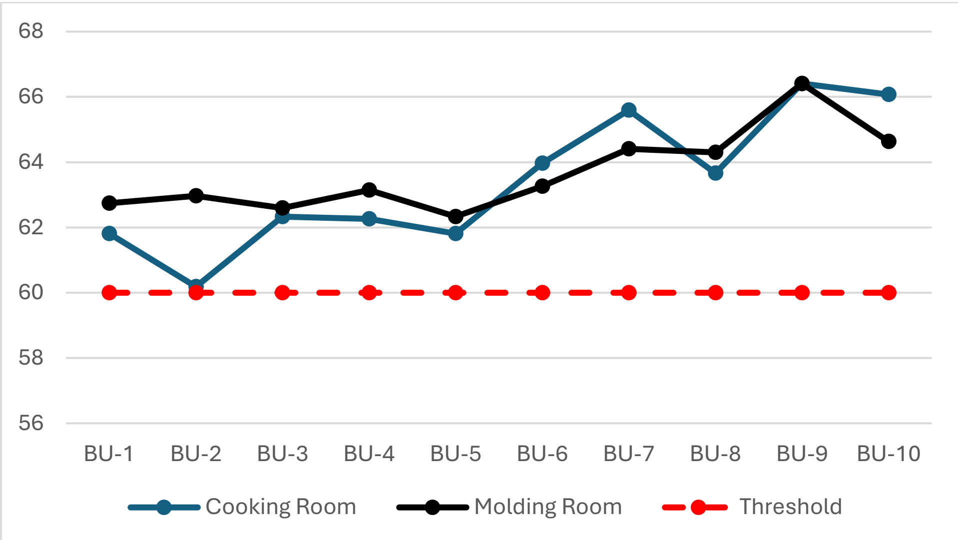

Figure 2. Comparison of average humidity in 10 bussines units with threshold value

Figure 2 shows that all business units have humidity above the threshold, both in the cooking room and in the molding room.

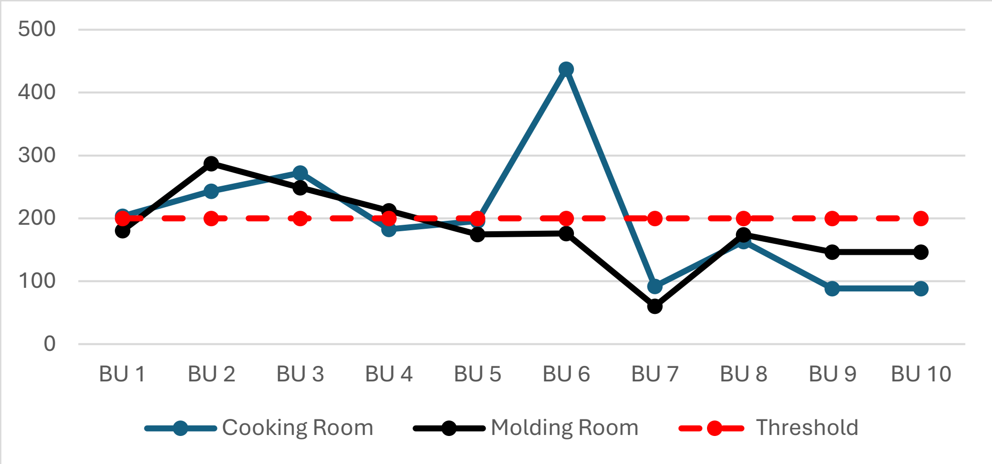

Figure 3. Comparison of average light intensity in 10 bussines units with threshold value

Figure 3 shows that in the cooking room, 60% of the business units have light intensity below the normal threshold. Meanwhile, in the molding room, 70% of the business units have light intensity below the threshold.

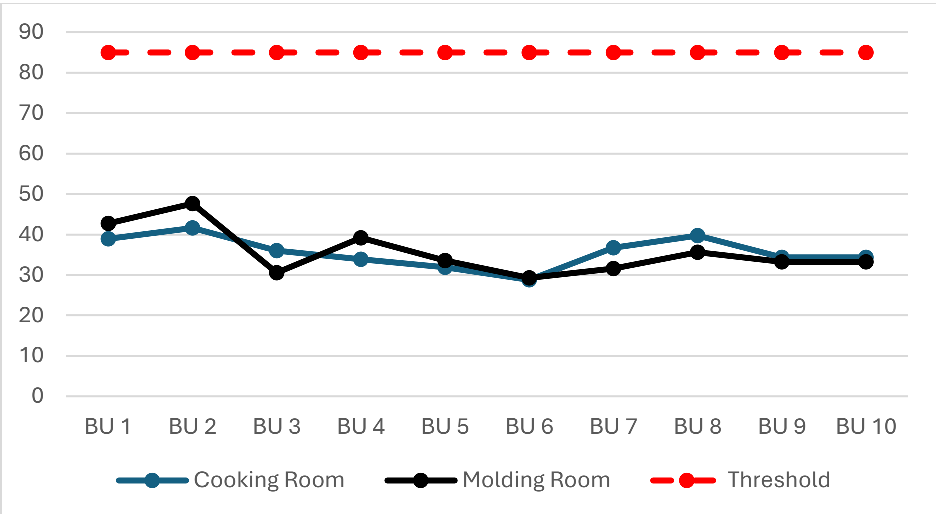

Figure 4. Comparison of average noise in 10 bussines units with threshold value

Figure 4 shows that all business units have met the noise criteria suitable for the work environment, as the noise level is below the threshold value. This variable meets the ergonomics aspect of the environment, so no further analysis is required.

4.3. Analysis of differential tests on business units that do not meet the threshold value

This section presents the results of the Kruskal Wallis test to evaluate differences in environmental conditions based on observation time (T1, T2, and T3) in each business unit. The analysis focuses on variables that do not meet the threshold value criteria. This paper uses the nonparametric Kruskal Wallis test because the data do not meet the assumption of a normal distribution. The summary results are presented in Tables 4.5 and 4.6.

Table 5. Summary of temperature difference test results for three observation periods T1, T2, T3

No	Business Unit	Cooking Room		Molding Room	
		Sig*	Description	Sig*	Description
1	BU 1	0,000	significantly different	0,000	significantly different
2	BU 2	0,001	significantly different	0,001	significantly different
3	BU 3	0,003	significantly different	0,001	significantly different
4	BU 4	0,001	significantly different	0,003	significantly different
5	BU 5	0,002	significantly different	0,006	significantly different
6	BU 6	0,000	significantly different	0,002	significantly different
7	BU 7	0,001	significantly different	0,000	significantly different
8	BU 8	0,002	significantly different	0,18	not significantly different
9	BU 9	Accepted with Threshold Limit Value		0,041	significantly different
10	BU 10			0,000	significantly different

*) The significance value is obtained from the results of the Kruskal Wallis test.

Table 6. Summary of humidity difference test results for three observation periods T1, T2, T3

No	Business Unit	Cooking Room		Molding Room	
		Sig*	Description	Sig*	Description
1	BU 1	0,003	significantly different	0,011	significantly different
2	BU 2	Accepted with Threshold Limit Value		0,003	significantly different
3	BU 3	0,005	significantly different	0,001	significantly different
4	BU 4	0,003	significantly different	0,769	not significantly different
5	BU 5	0,013	significantly different	0,029	significantly different
6	BU 6	0,004	significantly different	0,001	significantly different
7	BU 7	0,038	significantly different	0,016	significantly different
8	BU 8	0,007	significantly different	0,013	not significantly different
9	BU 9	0,017	significantly different	0,148	not significantly different
10	BU 10	0,001	significantly different	0,003	significantly different

*) The significance value is obtained from the results of the Kruskal Wallis test.

Table 7. Summary of light intensity difference test results for three observation periods T1, T2, T3

No	Business Unit	Cooking Room		Molding Room	
		Sig*	Description	Sig*	Description
1	BU 1	no need analysis		0,573	not significantly different
2	BU 2			no need analysis	
3	BU 3				
4	BU 4	0,126	not significantly different		
5	BU 5	0,097	not significantly different	0,145	not significantly different
6	BU 6	no need analysis		0,665	not significantly different
7	BU 7	0,070	not significantly different	0,146	not significantly different
8	BU 8	0,133	not significantly different	0,001	significantly different

9	BU 9	0,613	not significantly different	0,003	significantly different
10	BU 10	0,128	not significantly different	0,00	significantly different

*) The significance value is obtained from the results of the Kruskal Wallis test.

Based on the results of the Kruskal Wallis difference test presented in Tables 4.5 to 4.7, it can be concluded that most business units showed significant differences in environmental conditions across the three observation periods, particularly in temperature and humidity variables. However, no significant differences were observed in the lighting variable. These results indicate that temperature and humidity fluctuations are more dominant in the environment than lighting. Therefore, temperature and humidity control are a top priority in environmental ergonomics interventions.

5. Kesimpulan

The results of data processing indicate that most of the working environment conditions in the brem industrial center in Gebang Village, Nguntoronadi District, Wonogiri Regency, Indonesia do not meet environmental ergonomic standards, especially in the aspects of temperature, humidity, and light intensity. Comparison with the threshold values according to government regulations shows that: (1) for the temperature variable, all business units do not meet the threshold value; (2) for the humidity variable, all business units do not meet the threshold value; (3) for the lighting variable, 40% of the cooking room and 30% of the printing room meet the threshold value; and (4) for the noise variable, all business units meet the threshold value. The Kruskal Wallis test shows that there are significant differences in temperature and humidity variables at three working times. This is a top priority that requires improvement. This paper can be useful as a database in conducting ergonomic interventions in the white brem industrial center in Gebang Village..

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