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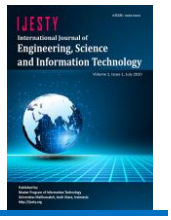

Interpretation of Building Maintenance Factors on Employee Convenience at The Factory of PT Campina Ice Cream Industry Tbk

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Abstract

Buildings are an essential part of human life. Building maintenance is carried out to provide security and comfort for building users. This study aims to determine and analyze the implementation of building maintenance, the influence of maintenance factors on building maintenance, and what maintenance factors have a dominant influence on the comfort of building users at PT. Campina Ice Cream Industry Tbk. This study uses a quantitative approach to data collection using a questionnaire. The population used in this study were employees at the PT. Campina Ice Cream Industry Tbk has a total of 520 employees. Meanwhile, the research sample was 72 employees at PT. Campina Ice Cream Industry Tbk. The data was tested using the validity test and reliability test. The analytical method used is multiple linear regression analysis with hypothesis testing using the t-test. The study results show that the condition of building maintenance is carried out at the factory of PT. Campina Ice Cream Industry Tbk, through architectural, mechanical, and electrical maintenance, has been carried out well, starting from wall and window maintenance and wall/glass cleaning, properly providing and maintaining health facilities, and holding office facilities and infrastructure, especially in regular electrical installations. The results of the t-test show that architectural, mechanical, and electrical maintenance has a significant effect on comfort. The building maintenance variable that has the dominant influence on comfort is the electrical maintenance variable.

Keywords: Maintenance, Architectural, Mechanical, Electrical and Comfort.

1. Introduction

The need for buildings for various activities is increasing from time to time. From year to year, new facility buildings of different shapes and sizes always appear, where the aesthetics and completeness of the building facilities are a form of representation of the activities of its residents [1]. The infrastructure building consists of various kinds of facilities [2]. Buildings have the most constituent facilities, from the main structure to the complementary buildings [3]. Building maintenance is carried out in the construction world so that buildings can be maintained [4]. PT. Campina Ice Cream Industry Tbk is a local company known since its establishment in 1972 with a large production capacity [5]. Ice Cream Products from PT. Campina Ice Cream Industry Tbk has also succeeded in penetrating a fairly wide market share, as evidenced by the distribution of Campina Ice Cream, which has reached all parts of Indonesia [6]. In the city of Surabaya, there is a PT. Campina Ice Cream Industry Tbk, which is located at Jl. Raya Rungkut Industry II No.15, Tenggilis Mejoyo District [7]. If you look deeper, PT. Campina Ice Cream Industry in Surabaya consists of several buildings in the same layout in one location [8]. Inside the building, various divisions carry out each work activity to achieve company goals [9]. Recognizing how vital building maintenance is for the comfort of employees at work, the company should pay consistent attention to the condition of the buildings it owns [10]. However, PT faces several realities. Campina Ice Cream Industry Tbk in Surabaya has no planned and regular maintenance system, only repairing damaged parts [11]. In other words, no well-planned routine and periodic maintenance [12].

2. Literature Review

According to the Minister of Public Works Regulation No. 24 of 2008 concerning Guidelines for the Maintenance and Maintenance of Buildings [13]. A building is a physical form of construction work that is integrated with its location [14]. Partially or wholly located on and in the ground and water, which functions as a place for humans to carry out their activities [15]. Both for housing or residence, religious, business, social, cultural, and special activities [16].
Maintenance is an effort to maintain the condition of the building so that it continues to function as it should or to improve the shape of the building and protect against damaging influences [17]. Following are some maintenance and repair concepts that can be carried out[18]:

a. Maintenance, namely routine actions on buildings or their components before they are damaged.
b. Minor repairs (repairing), namely an attempt to restore the performance of the building or its components to their initial state.

c. Improvement by strengthening (strengthening), namely efforts to increase the ability of the building or its components to exceed their initial capabilities.

According to the Regulation of the Minister of Public Works No. 24 of 2008 concerning Guidelines for the Maintenance and Maintenance of Buildings, maintenance work includes cleaning, trimming, inspection, testing, repair, and replacement of building materials or equipment, and other similar activities based on building operation and maintenance guidelines [19].

1. Architectural maintenance
   Architectural maintenance consists of:
   a. Maintain proper and orderly exits as a means of egress for building owners and users.
   b. Maintain the elements outside the building regularly and adequately to remain neat and clean.
   c. Maintain the elements in the room and its equipment correctly and regularly.
   d. Providing adequate and well-functioning maintenance systems and facilities through fixed equipment/equipment and work aids (tools).
   e. Perform proper maintenance of architectural ornaments and decorations by officers who have expertise and competence in their fields
2. Mechanical maintenance
   Mechanical maintenance consists of:
   a. Maintain and carry out periodic inspections of the air conditioning system so that indoor air quality meets the required technical and health requirements, including maintenance of leading equipment and air ducts.
   b. Maintain and carry out periodic inspections of the water distribution system, which includes providing clean water, sewage installation systems, fire hydrant systems, sprinklers, septic tanks, and waste treatment units.
   c. Maintain and carry out periodic inspections of the transportation system in the building, whether in the form of lifts, escalators, travelators, stairs, or other vertical transportation equipment.Pemeliharaan elektrikal
3. Electrical maintenance consists of:
   a. Perform periodic checks and maintenance on backup power generation equipment.
   b. Perform periodic checks and maintenance on lightning protection equipment.
   c. Conduct periodic checks and maintain electrical installation systems for supplying electrical power and room lighting.
   d. Conduct periodic inspections and maintain sound and communication (telephone) and data installation networks.
   e. Perform periodic checks and maintain a network of alarm and alarm systems.

According to Gawei et al. (2018), the comfort of a building is defined as a condition that provides various facilities needed by the function of the room or building and environment so that residents can carry out their activities properly, feel at home, and be productive. Comfort is the experience one receives from an intervention [20].

3. Methods

3.1. Research Procedure

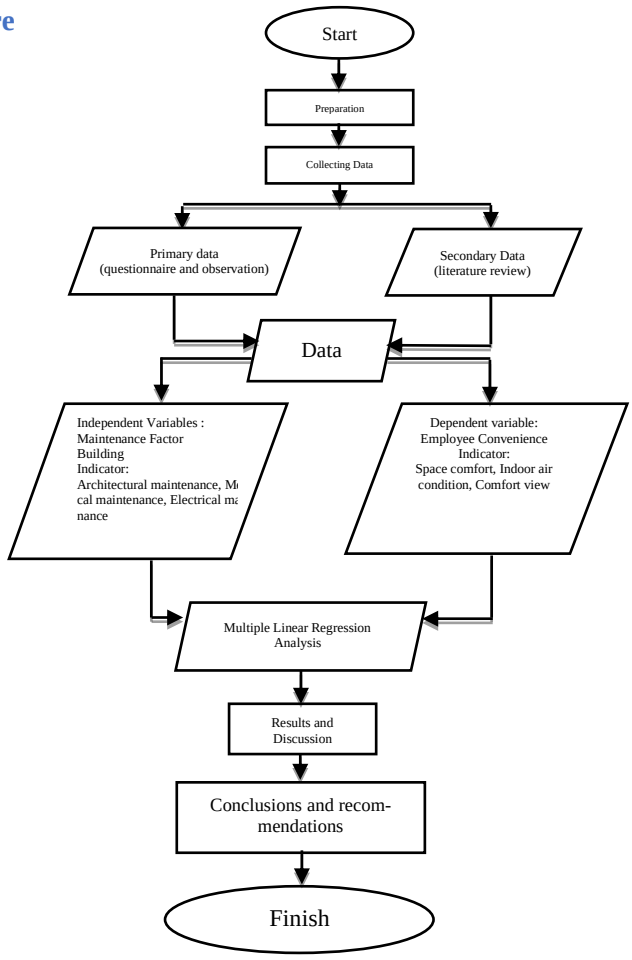

Fig 1. Research Flowchart

3.2. Data Source

The method used in this study is a technique with a questionnaire, which is a method of collecting data obtained by asking several questions that have been prepared. This method is done by distributing questionnaires to the intended respondents by asking several questions and statements previously designed, along with the available answer choices. The following are the steps in the questionnaire distribution method**.**

3.3. Operational Definition and Variable Measurement

1. Independent Variables
   a. Architectural Maintenance (X1)
   b. Mechanical Maintenance (X2)
   c. Electrical Maintenance (X3)

2. Dependent Variable
   a. Convenience (Y)

3.4. Population and Sample

The population in this study were employees at PT. Campina Ice Cream Industry Tbk has a total of 520 employees. Determination of the sample using the Slovin formula as follows:

$$n = \frac{N}{N(d)^2+1} \quad \text{..... (1)}$$

Information:
n = Number of samples sought
N = Total population
d = Precision value

$$n = \frac{520}{520\ (0{,}1)^2 + 1} = \frac{520}{6{,}2 + 1} = \frac{520}{7{,}2} = 72{,}2$$

Based on the calculation above, the number of samples obtained is 72.2 respondents, rounded up to 72. In this study, the sampling method was determined using purposive sampling. The considerations made in determining the respondents who will be sampled in this study are as follows:

1. Employees at PT. Campina Ice Cream Industry Tbk.
2. Have a working period of more than two years

4. Results And Discussion

4.1. Validity Test

Table 1. Validity Testing Results

Variables / Indicators	r count	r table	Information
Architectural Maintenance (X_1)			
$X_{1.1}$	0,735	0.1954	Valid
$X_{1.2}$	0,694	0.1954	Valid
$X_{1.3}$	0,701	0.1954	Valid
$X_{1.4}$	0,632	0.1954	Valid
$X_{1.5}$	0,596	0.1954	Valid
$X_{1.6}$	0,686	0.1954	Valid
$X_{1.7}$	0,614	0.1954	Valid
$X_{1.8}$	0,654	0.1954	Valid
Mechanical Maintenance (X_2)			
$X_{2.1}$	0,790	0.1954	Valid
$X_{2.2}$	0,776	0.1954	Valid
$X_{2.3}$	0,734	0.1954	Valid
$X_{2.4}$	0,774	0.1954	Valid
Electrical Maintenance (X_3)			
$X_{3.1}$	0,625	0.1954	Valid
$X_{3.2}$	0,641	0.1954	Valid
$X_{3.3}$	0,706	0.1954	Valid
$X_{3.4}$	0,687	0.1954	Valid
$X_{3.5}$	0,706	0.1954	Valid
$X_{3.6}$	0,670	0.1954	Valid
$X_{3.7}$	0,788	0.1954	Valid
$X_{3.8}$	0,787	0.1954	Valid
Comfort (Y)			
$Y_{1.1}$	0,779	0.1954	Valid
$Y_{1.2}$	0,755	0.1954	Valid

$Y_{1.3}$	0,737	0.1954	Valid
$Y_{1.4}$	0,658	0.1954	Valid
$Y_{1.5}$	**0,510**	**0.1954**	**Valid**

Source: Data processed by researchers (2023)

Table 1 above shows that the variable indicators used in this study have a correlation value (count) above (table) 0.1954. This means that all indicators used to measure all variables in this study are declared valid.

4.2. Reliability Test

The reliability test of the research results is described in the following table:

Table 2. Reliability Test Results

Variables	*Cronbach's Alpha* Value	*Cronbach's Alpha* Standard	Information
Architectural Maintenance (X_1)	0,816	0,6	**Reliable**
Mechanical Maintenance (X_2)	0,768	0,6	**Reliable**
Electrical Maintenance (X_3)	0,846	0,6	**Reliable**
Comfort (Y)	0,723	0,6	**Reliable**

Source: Data processed by researchers (2023)

Based on Table 2 above, it can be seen that the independent variables consisting of architectural maintenance (X1), mechanical maintenance (X2), and electrical maintenance (X3), as well as the dependent variable comfort (Y), each have a Cronbach Alpha value more excellent than 0,6. This result means these variables are reliable and can be used in further analysis.

4.3. Multiple Linear Regression Analysis

Table 3. Multiple Linear Regression Analysis

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.540	.339		1.594	.115
	Architectural Maintenance (X1)	.348	.112	.330	3.110	.003
	Mechanical Maintenance (X2)	.190	.091	.221	2.088	.041
	Electrical Maintenance (X3)	.349	.106	.345	3.283	.002
a. Dependent Variable: Comfort (Y)						

Source: Data processed by researchers (2023)

Based on the table above, the regression equation formed in this regression test is:

$$Y = 0{,}540 + 0{,}348X_1 + 0{,}190X_2 + 0{,}349X_3 \quad \ldots\ldots (2)$$

The model can be interpreted as follows:

1. The constant (a) of 0.540 means that if the independent variables of architectural maintenance, mechanical maintenance, and electrical maintenance are of constant value, then the magnitude of the dependent variable for comfort is a value of 0.540 units.
2. Architectural maintenance (X1) has a coefficient value of 0.348. This indicates that the variable coefficient of architectural maintenance (X1) has a positive (unidirectional) effect on comfort (Y). If the architectural maintenance increases by one unit, assuming other variables are constant, comfort will increase by 0.348 units. This means the higher the architectural maintenance value, the higher the comfort.
3. Mechanical maintenance (X2) has a coefficient value of 0.190. This indicates that the variable coefficient of mechanical maintenance (X2) has a positive (unidirectional) effect on comfort (Y). If the automatic maintenance increases by one unit, assuming other variables are constant, comfort will increase by 0.190 units. This means that the higher the value of mechanical maintenance, the higher the comfort.
4. Electrical maintenance (X3) has a coefficient value of 0.349. This indicates that the variable coefficient of electrical maintenance (X3) has a positive (unidirectional) effect on comfort (Y). If electrical maintenance increases by one unit, assuming other variables are constant, comfort will increase by 0.349 units. This means that the better the electrical maintenance, the higher the comfort.

4.4. Analysis of the Coefficient of Determination (R square)

The correlation coefficient and the coefficient of determination values show the strong relationship between the independent and dependent variables and how much influence the independent variables have on the dependent variable.

Table 4. Coefficient of Determination

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.781[a]	.609	.592	.39139
a. Predictors: (Constant), Electrical Maintenance (X3), Mechanical Maintenance (X2), Architectural Maintenance (X1)				

Source: Data processed by researchers (2023)

The coefficient of determination (R^2) value is 0.609 or 60.9%. This means that the independent variables of architectural maintenance, mechanical maintenance, and electrical maintenance influence the dependent variable of 60.9%, while the remaining 39.1% is influenced by other factors outside the variables of this study. From these results, it can be concluded that the effect of 60.9% of the three independent variables on the dependent variable can be in the strong category.

Table 5. Multiple Linear Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.540	.339		1.594	.115
	Maintenance Architectural (X1)	.348	.112	.330	3.110	.003
	Maintenance Mechanical(X2)	.190	.091	.221	2.088	.041
	Maintenance Electrical (X3)	.349	.106	.345	3.283	.002
a. Dependent Variable: Comfort (Y)						

Source: Data processed by researchers (2023)

From the calculation results in the table above, the count value for the architectural maintenance variable is 3.110, with a significance level of 0.003. Because the count (3.110) > table (1.99547) and the resulting significance value is 0.003, which is smaller than 0.05, then H0 is rejected, and H1 is accepted. This means that the independent variable of architectural maintenance significantly affects the dependent variable of comfort.

From the calculation results in the table above, the count value for the mechanical maintenance variable is 2.088, with a significance level of 0.041. Because the count (2.088) > table (1.99547) and the resulting significance value is 0.041, which is smaller than 0.05, then H0 is rejected, and H1 is accepted. This means that the independent variable mechanical maintenance significantly affects the dependent variable comfort.

From the calculation results in the table above, the count value for the electrical maintenance variable is 3.283, with a significance level of 0.002. Because the count (3.283) > table (1.99547) and the resulting significance value is 0.002, which is smaller than 0.05, then H0 is rejected, and H1 is accepted. This means that the independent variable of electrical maintenance significantly affects the comfort-dependent variable.

4.5. Dominant Test

4.5.1. Variables that have a dominant effect

Table 6. Multiple Linear Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.540	.339		1.594	.115
	Maintenance Architectural (X1)	.348	.112	.330	3.110	.003
	Maintenance Mechanical(X2)	.190	.091	.221	2.088	.041
	Maintenance Electrical (X3)	.349	.106	.345	3.283	.002
a. Dependent Variable: Comfort (Y)						

Source: Data processed by researchers (2023)

The standardized coefficient beta (β) shows that the architectural maintenance variable has a value of 0.330, while the mechanical maintenance variable is 0.221 and the electrical maintenance is 0.345. So, electrical maintenance is a variable that has the dominant influence on comfort, namely electrical maintenance, because it has the most considerable standardized value of coefficient beta (β) of the other variables.

4.6. Discussion

Building maintenance is carried out at the PT factory. Campina Ice Cream Industry Tbk is currently quite reasonable. Through architectural maintenance, the company takes care of wall/glass cleanliness and repairs any damage on every door and window hinge. This is done for no other reason than for the comfort and safety of employees to avoid conditions of wall damage, which raises the potential for work accidents. However, maintenance through painting the walls is still not optimal; it is done regularly.

The condition of building maintenance through mechanical maintenance shows that the provision and maintenance of health facilities such as sinks, bathtubs, showers, and toilet seats are in good condition to ensure the comfort of employees. However, the maintenance of pipe conditions to support production operations is still not adequately paid attention to, with indications of frequent pipe leaks, which can disrupt production activities.

Building maintenance through electrical maintenance shows a pretty good condition through the maintenance of office facilities and infrastructure, especially in electrical installations that are properly and regularly arranged to improve employees' health and safety. However, access and provision of wifi are still not optimal, as seen from the provision of wifi, which is still uneven in each building, and also, the existing wifi network is still unable to run smoothly (slow), making it challenging to access communication.

The results of the t-test for the effect of architectural, mechanical, and electrical maintenance on comfort obtained count> table, and the resulting significance value is less than 0.05; this proves that architectural, mechanical, and electrical maintenance has a significant effect on comfort. These results are consistent with previous research by Bugaleng and Pontan (2022), which proved that building maintenance affects comfort. Nasrullah's study (2021) also demonstrates that building maintenance affects comfort.

Building maintenance factors that have a dominant influence on the comfort of building users at PT. Campina Ice Cream Industry Tbk is electrical maintenance with the most significant influence among other variables, equal to 0.345. Electrical maintenance is an integral part of supporting comfort because this maintenance is very vital for the operational activities and daily work activities of employees, such as the provision of office facilities and infrastructure, wifi, LCD, telephone network, and also electricity supply in each building to support the company's operational activities.

5. Conclusion

Based on the results of the research and discussion used according to the hypothesis that was carried out, it can be concluded:

a. The condition of building maintenance is carried out at the PT factory. Campina Ice Cream Industry Tbk, through architectural, mechanical, and electrical maintenance, has been carried out well, starting from wall and window maintenance and wall/glass cleaning, properly providing and maintaining health facilities, and holding office facilities and infrastructure, especially in regular electrical installations.
b. The results of the t-test show that architectural, mechanical, and electrical maintenance has a significant effect on comfort. This means that when architectural, mechanical, and electrical maintenance is improved, the comfort of employees at PT. Campina Ice Cream Industry Tbk will increase.
b. Building maintenance factors that have a dominant influence on the comfort of building users at PT. Campina Ice Cream Industry Tbk is electrical maintenance.

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