

Level Analysis of Palangka Raya University Building Damage

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Abstract

The lecture building is the same building as the building in general, namely a building made of wood or concrete construction. During its operation, the potential for damage to an old building or a relatively newly constructed building is very large. There is no data on damage at the University of Palangka Raya that has caused a decrease in the level of productivity of activities carried out by building owners or users so that the condition of the college building is not well maintained. This research was conducted by conducting a survey of filling out the form in the building of the first lecture building of the Faculty of Economics and Business, University of Palangka Raya. The survey form was analyzed further, 3 categories of component types emerged, namely Architectural: Foundations, Sloof, Columns, Ring Balk, Walls, and Roof Frames, Architectural: Roofs, Ceilings, Floors, Locks, Frames and Leaves, as well as Painting, Utilities: MCK, and Electrical: Electric. The analysis used is descriptive analysis. The results of this analysis show that 3 components, which have a percentage damage of 0.5% of keys, 0.7% of frames and leaves, and 7.37% of painting, with a total of 8.6% fall into the category of damage levels, namely lightly damaged, with a budget of Rp. 759.736.00 for keys, Rp. 3,495.992.39 for frames and leaves, and Rp. 106.463.066.64 for painting, with a total cost of damage of Rp. 110,718,795.02. This research is useful for managers and further research can be a reference in improving the quality of the building.

Keywords: Lecture building, level of damage, budget plan

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1. Introduction

Buildings is a physical form of construction work that is integrated with its seat, partly or completely located above and / or in the ground and/or water, which functions as a place for humans to carry out their activities, either for or residences, religious activities, business activities, culture, and special activities (Permen-PU No. 11 2018). buildings has become an important subject (Heckl, 1981).

The potential for damage to an old or relatively newly built building is very large, usually the appearance of damage that occurs is seen after the building begins to be operated so that the function of the building, especially its comfort, is reduced (Rohmat, 2020).

So that the damage that occurs does not get worse in the building of the Palangka Raya University building, it requires maintenance and maintenance measures (Housing, 2018).

If the overall condition of the building and also the volume of damage from each of its components can be known, then the building owner should also prepare the estimated costs needed. In determining the costs used to carry out maintenance, there are several ways such as estimating the cost of maintaining and maintaining buildings using a rough estimated estimate price estimate (Nurtanto, 2020).

Based on a literature study, data identification of the level of damage and budget for damage to buildings at Palangka Raya University itself has never been carried out and there has been no previous research on the level of damage to college buildings (Charisma, 2019). Therefore, this study is intended to examine the application of

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the activity of the stage of identifying the level of damage to the lecture building specifically at the University of Palangka Raya.

It is hoped that this research can provide information about how the development of the application of a concept of identifying the level of damage to lecture buildings to the budget plan for damage costs, especially at Palangka Raya University.

The purpose of this study was to find out the components of the damage, analyse the level of damage, and analyse the budget plan for the cost of damage to the Palangka Raya university building.

The limitations of problem in this research include: 1. This research is focused on the building of a non-high-rise lecture building, namely the building of building I of the Faculty of Economics and Business at Palangka Raya University. 2. This study was conducted on an assessment of physical condition based on the survey form that has been prepared and the level of damage, namely lightly damaged, moderately damaged, and severely damaged. 3. The calculation of the initial cost budget plan only includes work: earth, concrete, split stone, finishing, floor and wall, door and window frames, MCK, electricity, roofing, and finishing. 4. Rab calculation using AHSP 2016 and Basic Price of Palangka Raya City in the Second Semester of 2021.

The benefits of this research are: 1) For building managers, this research is useful to provide references on the application of early identification of damage levels and find out the estimated budget for damage costs in non-high-rise college buildings that they manage and can be a reference in improving the quality of the building. 2) For researchers as prospective civil engineering graduates who will later enter the world of construction, this research is useful in providing more knowledge about the level of damage to buildings.

2. Literature Review

2.1. Buildings

Lecture buildings to use less energy or Zero Energy (ZE) has become more important (Layeni et al., 2020). Lecture buildings are the same buildings as buildings in general, namely buildings made of wood or concrete construction. In addition, what distinguishes it from buildings in general is that the lecture building is owned by the relevant University or Institute under the auspices of the Ministry of Education and Culture of the Republic of Indonesia. College buildings must have a minimum quality standard of class A or equivalent, and lecture halls of at least 1 (one) square meter per student (Culture, 2020).

2.2. Building Classification

The classification of state buildings is buildings for official purposes that become/will be owned by the state and are held with sources of financing derived from state budget funds, and/or other legitimate acquisitions, such as: office buildings, school buildings, hospital buildings, warehouses, state houses, and others. As for the classification of building use, for Universities/Academies included in the classification of buildings is not simple (Housing, 2018).

2.3. Scope of Building Components and Maintenance

2.3.1. Component

According to (Wu et al., 2018) the types of components contained in buildings can be divided into sub-components, components can be seen in table 1.

2.3.2. Therapy

Maintenance work includes repair and/or replacement of building parts, components, building materials, and/or infrastructure and facilities based on the building maintenance technical plan document, taking into account the construction implementation documents, namely:

- a. Rehabilitation
- b. Renovation
- c. Restoration
- d. Damage Level

The intensity of building damage can be classified as three levels of damage, as can be seen in table 2.

Table 1. Components and sub-components

Component	Sub Components		
Architectural	Window	Roof Covering	Key and Chain Jobs
	Door	Wall Cladding	Painting
	Ceiling Cover	Floor Coverings	Floor
Structural	Foundation	Column	Beam
	Wall	Bearers	-
	Roof Frame	-	-
Mechanical and Electrical Components	Electrical Installations	Air conditioning installations	Sanitary and wastewater work
	Transport installation in buildings	Lightning arrester installation	-

Source: Kempa, 2018.

Table 2. Damage Level

Damage Level	Percentage
Lightly Damaged	>30%
Moderately Damaged	31-45%
Heavily Damaged	>45%

Source: Permen-PU No. 11, 2018

2.3.3. State Building Financing

According to the PUPR ministerial regulation Number 22/PRT/M/2018 concerning the Construction of State Building Buildings, including:

- a. Components of the cost of construction
- b. Standard Fees and Non-Standard Fees.
- c. Highest Unit Price Standard.
- d. Other work costs that accompany/complete the construction.
- e. The cost of construction in the framework of maintenance.

Financing for the construction of state buildings consists of construction financing for standard work (basic work for which there is already a standard for the highest unit price) and construction financing for non-standard work (for which there is no standard for the highest unit price and must be calculated based on real needs and market prices). The cost of standard and non-standard work is used for the cost of carrying out the physical construction of the construction of state buildings (Budiharto, 2018). The overall cost of the building can be seen in table 3.



Figure 1. Overall Cost of Building (in Indonesia)
Source: (Housing, 2018)

HSBGN damage work costs, including costs for work for maintenance: structure, architecture, finishing, utilities. Calculated based on the highest unit price standards based on the classification of state building buildings, the percentage of the degree of damage to the building, and the floor area of the building. Here's a schematic calculation:

$$\text{Cost of Work} = (\text{HSBGN}) \times (\text{R}) \times (\text{Ltb})$$

with:

- HSBGN : BGN's Highest Unit Price Standard
- R : Percentage Damage rate
- Ltb : Total floor area of the building

3. Materials and Methods

This study used the survey method. The research data was obtained from the survey form. The survey form consists of the components of the building, the size of the initial building, the size of the building, the instructions for filling out the form. The study was conducted for 2 months (August-September 2021). The technique of filling out the survey form is carried out by the researcher himself. The data were analysed using descriptive analysis methods.

3.1. Stages of Research

Determining this research is carried out with five stages, where each stage affects each other. In full, the stages of research activities will be explained in figure 1.

3.2. Data Type

There are two types of data used in this study, namely primary data and secondary data (Sugiyono, 2018).

- (1) Primary data are data obtained directly from the object of study. Data collection is directly carried out by filling out survey forms and documentation.
- (2) Secondary Data is the data obtained, namely the calculation of the initial cost budget plan, AHSP 2016, the basic price of the city of Palangka Raya in the second semester of 2021 and literature studies, both from writings, relevant references, journals, article books and other sources that support research.

3.3. Research Instruments

Research Instruments The instruments in this study are survey and documentation forms, namely data collection through forms that are compiled to obtain information on observation activities directly using all five senses and obtain data through research on written objects, such as books, magazines, diaries, artifacts, videos and so on (Sugiyono, 2018).

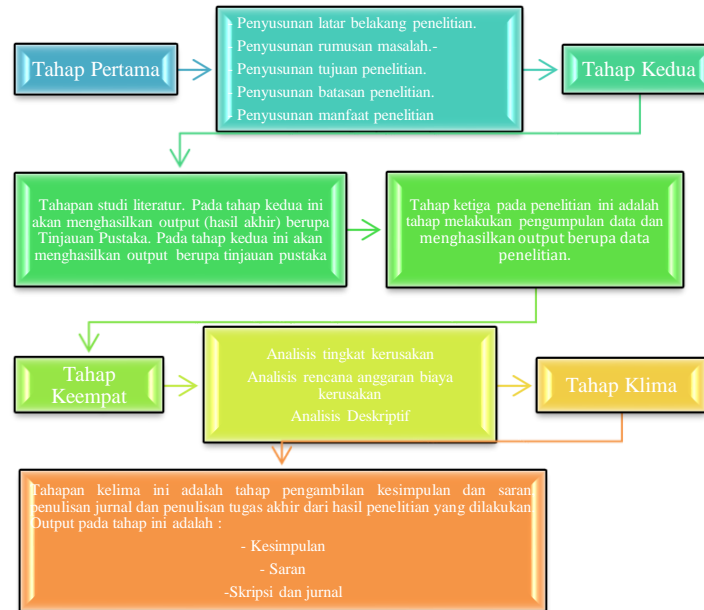


Figure 2. Stages of Research (in Indonesia)
Source: Data Analysis (2021)

3.4. Data Processing Techniques

As for the steps in data processing in this study, as follows:

- (1) Collecting drawing data on existing building plans of buildings.
- (2) Calculating the initial building cost budget plan using AHSP (worker unit price analysis) 2016, basic price semester II Kota Palangka Raya 2021 using Microsoft excel 2010.
- (3) Compile components of damage to non-storey college buildings with Microsoft excel 2010.
- (4) Calculate the percentage rate of damage to a component that is damaged using Microsoft excel 2010.
- (5) Calculate the damage cost budget plan using Microsoft excel 2010.

4. Result and Discussion

Before analysing the research data, the calculation of the RAB (Budget Plan cost) of building I of the Faculty of Economics and Business was first carried out, AHSP (Analysis of unit price of work) 2016, and Basic Price for the second semester of Palangka Raya City 2021.

4.1. Components of Damage to College Building Buildings

Based on the results of identification surveys and documentation in the field in the building of the lecture building I of the Faculty of Economics and Business, University of Palangka Raya, there are 3 components that have damage, namely key components, sills and leaves, as well as painting in the type of architectural components. The results of the survey and documentation can be seen in figure 3.

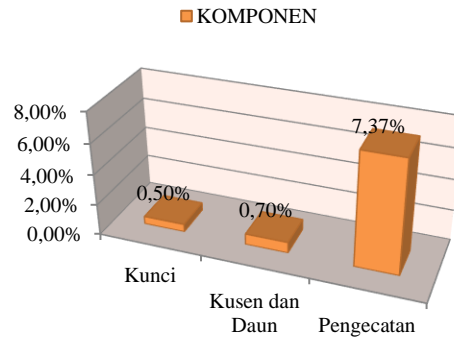


Figure 3. Damage Level (in Indonesia)
Source: Data Analysis (2021)

The total percentage of damage to these components is 8.6% in the Category of Lightly Damaged.

4.2. The cost of damage to buildings

Comparison of initial costs with the cost of damage to non-high-rise buildings can be seen in figure 4.

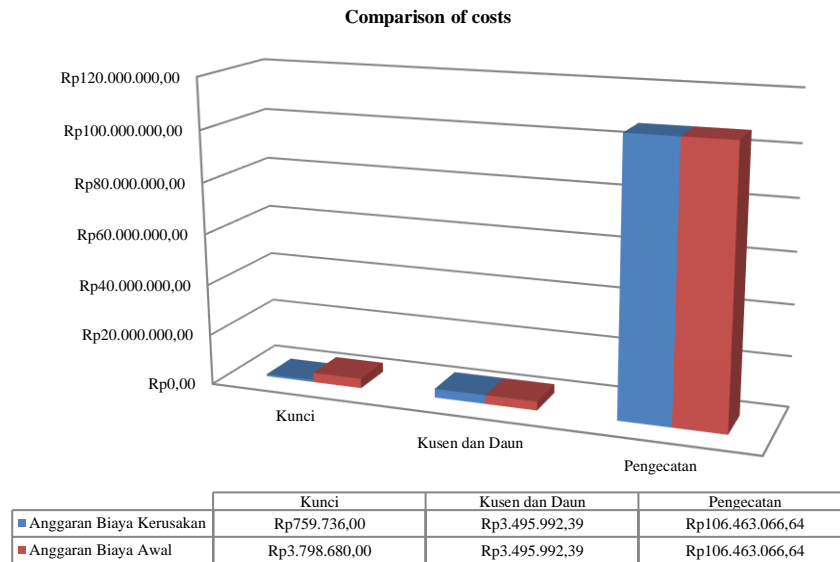


Figure 4. Cost Budget Comparison (in Indonesia)
Data Source: Data Analysis (2021)

The results of the recapitulation of the damage cost budget based on percentage and the cost budget based on the quantity of damage, can be seen in table 3.

Table 3. Data Validity

No	Cost Based	Total Cost
1	Quantity of damage to buildings	Rp110.718.795,02
2	Percentage of building damage	Rp110.718.795,02
	Difference	IDR 0

Source: Data Analysis (2021)

5. Conclusion

Based on the results and discussion, we can conclude that:

- (1) There are 3 categories of component types in the building of the first lecture building of the Faculty of Economics and Business, University of Palangka Raya, namely Structural, Architectural, Utility, and Electrical. Each of these types has components, namely Architectural: Foundation, Sloof, Column, Ring Balk, Wall, and Roof Frame, Architectural: Roof, Ceiling, Floor, Lock, Frame and Leaf, as well as Painting, Utilities: MCK, and Electrical: Electrical.
- (2) There are 3 components, which have a percentage damage, namely locks of 0.5%, sills and leaves of 0.7%, and painting of 7.37%, with a total of 8.6% falling into the category of damage level, namely Lightly Damaged.
- (3) The damage cost budget is contained in 3 components, namely the key of IDR 759,736.00, sills and leaves of IDR 3,495,992.39, and painting of IDR 106,463,066.64.

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