Evaluation Accessibility Musamus University Lecture Building The Architecture Department To The Building Standard

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Abstract. In terms of the building development construction or space with the designation as activity place and mass facility, it must comply with the rules of standards safety, security, convenience and comfort building as well as standards requirement. Accessibility in a building is very important, especially the building as a place of activity or public services, such as a lecture hall building which of course will accommodate a large number of people. For those reasons a good planning that can meet the security and safety requirements in the building itself from the impact of unwanted natural disasters. This study evaluates the existing condition of accessibility in the lecture building of the architecture department of the Musamus University of Merauke. The results of this study are the results of measurements and assessments of the physical condition of the building against the technical standard regulations that have been set by the government, the building of the lecture hall building for the architecture department of Musamus University is in a condition that does not meet these requirements. So, if a natural disaster, earthquake or fire occurs, it will cause injuries and even death.

Keywords: Accessibility, Safety building standarts, Measurements and Assessments

1 Introduction

Buildings play a very important role as a place where humans carry out their daily activities. The building arrangement is specifically stated in Law Number 28 of 2002 concerning Buildings.

In order to get a safe and comfortable space in a building, especially lecture rooms, standards are required that must be met to support the safety of users or building occupants. In terms of the development of building construction or space with the designation as a place of activity in general and because it is a mass facility, it must comply with the rules or standards regarding safety, security and convenience and comfort of the building as well as other required standards.

Based on the 2011 National Education Standards Agency [1], the lecture room is a space that functions for teaching and learning activities, with capacities in accordance with the 2013 National Higher Education Standards.

In the Regulation of the Minister of Public Works and People's Housing of the Republic of Indonesia Number 14/PRT/M/2017 [2] concerning the requirements for building facilities, it is stated that the Completeness of Infrastructure and Facilities for Building Utilization is the provision of facilities in buildings and the environment according to the needs of all age groups and conditions of physical limitations, mental, intellectual, or sensory based on the function of the building to provide convenience for users and visitors in their activities in the building.

To ensure security, comfort and convenience in buildings in accordance with the laws that have been set by the government, every building must be organized in an orderly manner and must be in accordance with its function, and must meet the requirements for building management, which is in accordance with Law Number 28 2002 concerning the building of the building. Building planning is attempted to provide convenience for residents so that they can move effectively and efficiently.

2 Literature Review

2.1 Lecture Building

The lecture hall is a student learning space while on campus. According to the National Education Standards Agency (BSNP) in 2011 [1], the lecture room is a room where learning activities take place on a regular basis. This learning activity can be done in the form of lectures, discussions, seminars, tutorials, and the like.

According to the Badan Standar Nasional Pendidikan, 2011 [1] the maximum capacity of the lecture hall is 25 people with a standard room area of 2m2 for each student, the minimum area is 20 m2. Meanwhile, the minimum capacity for large lecture halls is 80 people with a standard room area of 1.5m2 for each

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student. According to the Standar Nasional Pendidikan Tinggi, 2013 lecture halls must be provided with an area of at least 60m².

2.2 Principles of Building Convenience

As stipulated in the PUPR Ministerial Regulation number 14/PRT/M/2017 [2] regarding the requirements for building facilities, it is stated that the building is a physical manifestation of the results of construction work that are interrelated and one unit with the location of the building. Where part or all of the construction of the building is on the ground or above the water, above the ground and in the water or in the ground or in the water. This regulation also states that buildings function as a place for humans to carry out their social activities, both for housing and other activities, both in general and specifically. Completeness of Infrastructure and Facilities for Building Utilization is the provision of facilities in buildings and the environment that are in accordance with needs and can provide convenience for users and visitors in their activities in buildings.

Each building must meet the requirements for building facilities which include ease of circulation or accessibility in the building, as well as the completeness of infrastructure and facilities in the use of the building. Ease of connection or accessibility in buildings includes the availability of facilities and accessibility that are easy, safe, and comfortable for every building user and building visitor. In an effort to provide facilities and accessibility of relationships within buildings, it is necessary to consider the availability of: Horizontal relationships between spaces/between buildings; Vertical relationship between floors in the building; and means of evacuation.

The First part of the PUPR Ministerial Regulation number 14/PRT/M/2017 [2] states that: every building and environment including open space must meet the requirements for facilities in accordance with the function and classification of the building. The fulfillment of the requirements for building facilities is carried out through the application of universal design principles in the building construction stage and the use of adequate basic room sizes.

The second part of the universal design principles article 5 of the PUPR Ministerial Regulation number 14/PRT/M/2017 [2] states that: The universal design principles referred to include: Equal use of space; Safety and security for all; Easy access without hindrance; easy access to information; independent use of space; efficiency of user efforts; and ergonomic fit of size and space. The application of these universal design principles must take into account the needs and abilities of persons with disabilities, children, the elderly, and pregnant women.

Indonesia Law Number 28 of 2002 in article 31 [3], mentions the ease of relations between buildings, including for groups with disabilities or special needs. This law also regulates the completeness of facilities and infrastructure in the use of buildings. The buildings in question are buildings owned by the government, private sector, or individuals that function other than as private residences and are used by many people.

Furthermore, through the Minister of Public Works Regulation Number 30/PRT/M/2006 [4] concerning Technical Guidelines for Facilities and Accessibility in Buildings and the Environment, it must comply with the principles of convenience, the principle of usability, the principle of safety, and the principle of independence. Based on Law no. 28 of 2002 [3], that in order to realize a building that is functional and in accordance with a harmonious and harmonious building structure with its environment, users must ensure the reliability of the building from the aspects of safety, health, comfort, and convenience.

2.3 Building Ease and Safety Requirements

It is regulated in Law No. 28 of 2002 [3], comfort requirements are technical requirements in the feasibility of building functions, article 26 states that building comfort requirements include the comfort of moving space and the relationship between spaces, room conditions, views, vibration levels and noise levels. The level of comfort is also influenced by the environment, both the physical environment and the non-physical environment (human nature).

A building is designed to accommodate all the activities of its occupants. The building must be supported by a comfortable and healthy environment for its users. The aspect of space comfort is generally influenced by the comfort of the space and the comfort of the relationship between spaces. The design of comfort in terms of circulation can be in the form of building or space layout, distribution of circulation for both people and goods, circulation of vehicles, circulation of high-rise buildings, and others.

3 Research Methods

This research phase is structured as follows: Literature Study, collecting and studying theories related to the research title. Data collection: The data collection stage is carried out to obtain data by going directly to the field. This research was conducted at the lecture building majoring in architecture at Musamus University in the city of Merauke. Observations were made using a primary survey. The primary survey carried out is by conducting a direct survey to the field. During the primary survey, photographs were taken that described factual conditions.

4 Results and Discussion

4.1 Application of Universal Design Principles and Use of Adequate Basic Space Size

The fulfillment of requirements for building facilities is carried out through the application of universal design principles in the stages of building construction (technical planning and construction implementation). The Universal Design Principles referred to include [5]:

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Equal use of space; The design of the building and the environment must be able to be used by every user without discrimination.
b. Safety and security for all; The design of buildings and the environment must minimize hazards and adverse consequences for everyone.
c. Easy access without obstacles; The design of the building and the environment must ensure easy access to, from and within the building that is barrier free physically and non-physically and is easy to understand regardless of the level of experience, knowledge, language skills, or concentration of users.
d. Easy access to information; The design of buildings and the environment must ensure easy access to communicative information for all, regardless of the conditions and sensory abilities of the users.
e. Independent use of space; The design of the building and the environment must take into account the various capabilities of its users so that it can be used independently.
f. Efficiency of user efforts; and The design of the building and the environment must be able to be used efficiently and comfortably with minimal effort from the users.
g. Ergonomic fit of size and space. The right size and space is provided to reach and use regardless of the user's body position, size, posture or mobility.

4.2 Basic Space Size

In fulfilling the requirements for building facilities, an adequate basic size of space is required which is determined based on:
a. The need for space for Building Users and Building Visitors;
b. Dimensions of the equipment; and
c. Circulation.

The circulation required to fulfill the convenience requirements is determined at a minimum of 30% of the total user space requirement and the dimensions of the equipment by considering the function and classification of the building.

4.3 Provision of Accessibility of Relationships in Buildings

4.3.1 Door Laying Technical Requirements

The main entrance/exit of the Public Building has an effective width of opening of at least 90 cm, and other doors having an effective width of opening of at least 80 cm [6].

Fig. 2. The basic size of the door width

1. One-way swing door must be designed and installed so that it can open fully 90° easily with the heaviest pressure/pull load of the door leaf 5 kg.

Fig. 3. The basic size of the swing door

2. One-way swing door in a room that is used by building users and visitors in large numbers, must be able to open to the outside for easy evacuation of Building Users and Building Visitors in the event of a fire or other emergency.

3. One-way swing doors, especially in public areas, must be able to provide clear visibility of objects behind the door or people approaching the door, including glass installation.

4. The glass on the one-way swing door must be installed no more than 75 cm above the floor level.

5. The free space in front of the 1-way swing door that opens outwards to the outside is at least 170 cm x 170 cm.

6. Furniture should not be placed in the free space in front of the swing door.

7. The placement of furniture must be spaced at least 75 cm from the door opening.

8. The 2-way swing door has the same requirements as the 1-way swing door.
Fig. 4. Standard distance of the door to the stairs

Fig. 5. The height of the door handle

4.3.2 Existing Condition of Lecture Room Door Laying.

Main door:
Door Dimensions:
Height: 230 cm
Width: 80cm/160cm
Door open outside

Exam and Meeting Room
Door Dimensions:
Height: 230 cm
Width: 80cm
Handle height from floor: 108cm
Glass height from floor: 123cm

Computer Laboratory Room
Door Dimensions:
Height: 228cm
Width: 70cm
Handle height from floor: 108cm
Glass height from floor: 123cm
Open the door to the outside

Ventilation Dimensions:
Height: 50cm
Width: 75cm
Open the door to the outside

Classroom Door 1
Door Dimensions:
Height: 228cm
Width: 70cm
Handle height from floor: 108cm
Glass height from floor: 123cm
Door open outside

Classroom Door 2
Door Dimensions:
Height: 228cm
Width: 70cm
Handle height from floor: 108cm
Glass height from floor: 123cm
Door open outside

Window Dimensions:
Height: 50cm
Width: 75cm
Window opening outside

Ventilation Dimensions:
Height: 50cm
Width: 75cm
Exit ventilation opening outside
4.3.3 Evaluation Results of Lecture Room Door Laying.

Table 1. Evaluation of Lecture Room Door Laying

| No   | Facility Name            | Requirements | Not Requirements | Information                                                                 |
|------|--------------------------|--------------|------------------|-----------------------------------------------------------------------------|
| 1    | Main door                | ✓            |                  | A lot of furniture is placed in front and behind the main door pintu          |
| 2    | Exam and Meeting Room    | ✓            | 1. Door width does not requirements |                                                                                  |
|      |                          |              | 2. The height of the glass does not requirements  |                                                                                  |
| 3    | Computer Laboratory Room | ✓            |                  | 1. Door width does not requirements                                           |
|      |                          |              | 2. The height of the glass does not requirements |                                                                                  |
| 4    | Classroom Door 1         | ✓            |                  | 1. Door width does not requirements                                           |

5. Classroom Door 2

| No   | Facility Name            | Requirements | Not Requirements | Information                                                                 |
|------|--------------------------|--------------|------------------|-----------------------------------------------------------------------------|
| 1    | Classroom Door 2         | ✓            |                  | 1. Door width does not requirements                                           |
|      |                          |              | 2. The height of the glass does not requirements  |                                                                                  |

6. Drawing Lab Room

| No   | Facility Name            | Requirements | Not Requirements | Information                                                                 |
|------|--------------------------|--------------|------------------|-----------------------------------------------------------------------------|
| 1    | Drawing Lab Room         | ✓            |                  | 1. Door width does not requirements                                           |
|      |                          |              | 2. The height of the glass does not requirements  |                                                                                  |

7. TA Lab Room

| No   | Facility Name            | Requirements | Not Requirements | Information                                                                 |
|------|--------------------------|--------------|------------------|-----------------------------------------------------------------------------|
| 1    | TA Lab Room              | ✓            |                  | 1. Door width does not requirements                                           |
|      |                          |              | 2. The height of the glass does not requirements  |                                                                                  |

4.3.4 Corridor Outside

Technical Requirements

1. The curtain must have an effective width sufficient for a wheelchair user or 2 people to pass by at least 140 cm.

2. It is not allowed to use a slippery floor covering material

4.3.5 Existing Condition Corridor Outside

1st Floor corridor outside:

| Dimension | Width: 250 cm |
|-----------|---------------|
| Width of column: | 208cm |
| Effective Width: | 195 cm |
| The floor covering of the lobby is not slippery | |

2nd Floor corridor outside:

| Dimension | Width: 250 cm |
|-----------|---------------|
| Width of column: | 200cm |
| Effective Width: | 195 cm |
| The floor covering of the lobby is not slippery | |
| Handle dimension | |
| Handle height: | 90cm |
| Handle width: | 6cm |
4.3.6 Evaluation Results of Corridor Outside.

Table 2. Evaluation of Corridor Outside

| No | Facility Name         | Requirements | Not Requirements | Information |
|----|-----------------------|--------------|------------------|-------------|
| 1. | 1st Floor corridor outside: | ✓            |                  |             |
| 2. | 2nd Floor corridor outside: | ✓            |                  |             |

4.3.7 Corridor Inside

Technical Requirements
1. The corridor must have an effective width sufficient for 1 person using a wheelchair to pass at least 92 cm.
2. Corridors must have an effective width that is sufficient for 2 people using wheelchairs to pass at least 184 cm.
3. The corridor must have an effective width sufficient for the circulation of 1 person with a disability and 1 pedestrian at least 152 cm.
4. Corridors with railings must have an effective width sufficient for 1 person using a wheelchair to pass at least 112 cm.

4.3.8 Existing Condition Corridor inside

1st Floor Corridor
Corridor dimensions
Width: 175 cm
Effective width: 170 cm

2nd Floor Corridor
Corridor dimensions
Width: 175 cm
Effective width: 170 cm

4.3.9 Evaluation Results of Corridor Inside

Table 3. Evaluation of Corridor Inside

| No | Facility Name         | Requirements | Not Requirements | Information |
|----|-----------------------|--------------|------------------|-------------|
| 1. | 1st Floor Corridor   | ✓            |                  | The placement of the corridor is not effective because it is blocked by the door opening in the room |
| 2. | 2nd Floor Corridor   | ✓            |                  | The placement of the corridor is not effective because it is blocked by the door opening in the room |

Fig. 6. Corridor technical standards
### 4.3.10 Stairs

Technical Requirements [7]:
1. Placement of stairs must pay attention to the distance between corridors and compartments.
2. If more than 1 public ladder is provided, then the distance between the stairs is calculated according to the number of Building Users and Building Visitors at the most 40 m.
3. The height of the steps (optride/riser) is not more than 18 cm and not less than 15 cm.
4. The width of the stairs (antride/tread) is at least 30 cm.
5. Stairs use non-slip material and are provided with anti-slip material (step nosing) at the edges.
6. Handrails must meet ergonomic standards that are safe, comfortable to grip and free from sharp and rough surfaces.
7. Stairs adjacent to the wall must be equipped with 2 layers of handrails with a height of 65 cm - 80 cm which are continuous at least on one side of the wall.
8. The clearance between the wall and the vines on the stairs that coincide with the wall is at most 8 cm.
9. The profile shape of the handrail must be easy to grip with a cross-sectional diameter of at least 5 cm.
10. The number of stairs up to the landing (landing) is a maximum of 12 stairs
11. Each side of the stairs that are not limited by walls must be lustered

![Stairs Technical Standard](image)

Fig. 7. Stairs technical standard

### 4.3.11 Existing Condition Stairs

**Main Stairs**
- Dimensions: Stair width: 90 cm
- Width of stairs: 30 cm
- Stair height: 15 cm
- Effective width of stairs: 66 cm
- Stair railing height: 90 cm
- Diameter of handrail: 5 cm
- Effective width of handrail: 75 cm

**Stairs 2**
- Stair width: 90 cm
- Width of stairs: 30 cm
- Stair height: 15 cm
- Effective width of stairs: 66 cm
- Stair railing height: 90 cm
- Diameter of handrail: 5 cm
- Effective width of handrail: 75 cm
- Handrail distance from wall: 10 cm

### 4.3.12 Evaluation Results of Stairs

**Table 4. Evaluation of Stairs**

| No | Facility Name | Requirement | Not Requirement | Information |
|----|---------------|-------------|----------------|-------------|
| 1  | Main Stairs   | ✓           |                | 1. The width of the Stairs is not effective so it does not meet the technical requirements  |
|    |               |             |                | 2. The creeping handle height does not meet the technical requirements  |
|    |               |             |                | 3. The number of steps up to the borders  |
2. Stairs 2

|   |   |   |
|---|---|---|
|   | does not | meet the technical requirements |

1. The width of the Stairs is not effective so it does not meet the technical requirements
2. The creeping handle height does not meet the technical requirements
3. The number of steps up to the borders does not meet the technical requirements

5 Conclusions

Accessibility in a building is very important, especially the building as a place of activity or a place for public services, such as a lecture hall building which of course will accommodate a large number of people. For this reason, it is necessary to plan that can meet security and safety requirements within the building itself from the unwanted impact of natural disasters.

The results of measurements and studies of the physical condition of the building against the technical standard regulations set by the government, the building for the lecture hall of the Musamus University architecture department is in a condition that does not meet these requirements. So, if a natural disaster, earthquake or fire occurs, it will cause injuries and even death.

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