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Stairs Designed for People with Special Needs

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ABSTRACT

The purpose of this paper is to explain the standard for stairs for people with special needs. This study was based on a literature review from various sources, particularly sources in Indonesia. Detailed examples on how to design stairs were presented. This study is hopefully used as a reference and a guide for architectural and environmental construction, particularly in hospitals, schools, and public facilities for people with special needs (i.e. wheelchairs, crutches, and canes for the blind).

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1. INTRODUCTION

When a building wants to be designed, an excellent plan must be added, especially considering the dimensions of 3-dimensional space (length, breadth, and height) (Rahmat, 2021). One of the important things in building construction is stairs. Stairs are facilities for vertical movement that are designed by considering the size and slope of the steps and inclines with adequate width. In general, stairs are divided into two: (i) general stairs, and (ii) emergency or evacuation stairs. The stairs for the evacuation route are different from the stairs used for daily mobilization.

Because of the importance of staircase design, there is a wealth of information regarding the manufacture of staircase standards (Roys, 2001; Haugen *et al.*, 2005; Sulistiyo & Sumarsono, 2020). One of the important factors is the design of standard stairs for people with special needs. People with special needs are people who experience limitations or extraordinariness, especially regarding physical (Maryanti *et al.*, 2021). Therefore, the purpose of this study is to explain the design of stairs for special needs.

2. METHODS

The paper was a literature review of some information about the standard size of space and the environment, and, specifically, this report focused on the design of stairs for people with special needs.

3. RESULTS AND DISCUSSION

In making stairs in the building, several factors must be considered. The requirements for making stairs are:

1. Stairs must have uniform tread and incline dimensions.
2. Stairs must have a slope of less than 60°.
3. There are no perforated ramps that can endanger stair users.
4. Stairs must be equipped with a minimum handrail on one side of the ladder.
5. The handrail must be increased in length at the ends (top and bottom) by 30 cm (see **Figure 1**).
6. The handrail must be easy to hold at a height of 65-80 cm from the floor, free from distracting construction elements, and the ends must be rounded or well deflected towards the floor, wall, or pillar (**Figures 2-5**).
7. For stairs located outside the building, they must be designed so that no rainwater pools on the floor.

As explained above regarding ladder requirements, stairs must have handrails (**Figures 2-5**). The handrail is adjusted to the type of ladder used. Standard examples of handrails for straight stairs, at the end of stairs, and turns can be seen in **Figures 2-4**, respectively. The size of the handle must be adjusted to the user's grip. Some examples of handrails can be seen in **Figure 5**. The standard stairs can be seen in **Figure 1**.

Broadly speaking, the ladder for people with special needs is almost the same. However, stairs for people with special needs must be equipped with some equipment, such as a guided block (see **Figure 6**). Handrails for people with special needs must also be equipped with handrails with braille (see **Figure 7**). The staircase process for people with special needs must also stop at the end (see **Figure 8**) and should not expand as shown in **Figure 9**. An example of a combination of components for stairs intended for people with special needs is shown in **Figure 10**.

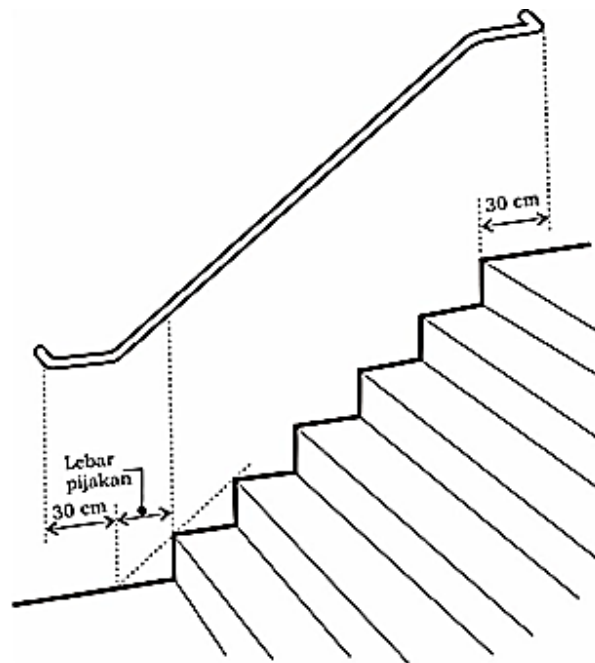


Figure 1. Details of recommended stairs. The image was taken from <https://eprints.uny.ac.id/63842/4/BAB%20II.pdf>

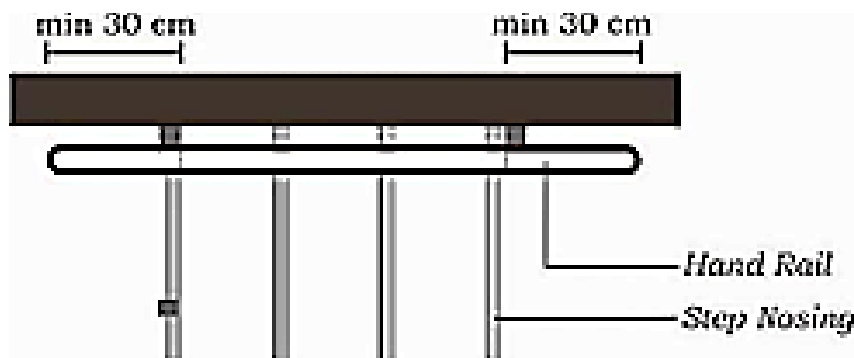


Figure 2. Handrail when straight. The image was taken from <https://eprints.uny.ac.id/63842/4/BAB%20II.pdf>

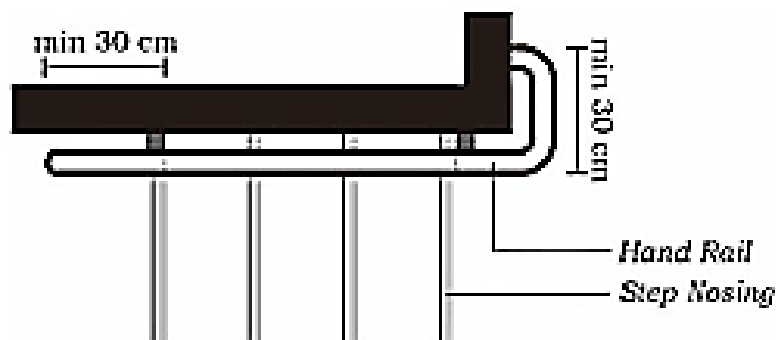


Figure 3. The handrail at the end of the stairs. The image was taken from <https://eprints.uny.ac.id/63842/4/BAB%20II.pdf>

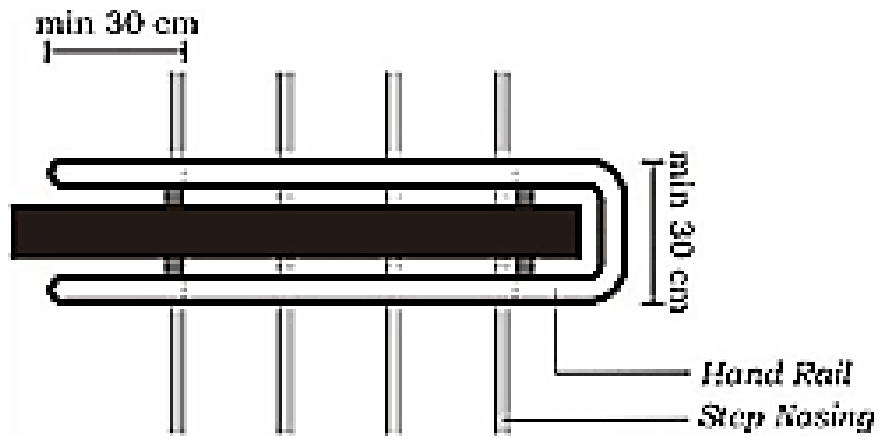


Figure 4. Handrail when turning. The image was taken from <https://eprints.uny.ac.id/63842/4/BAB%20II.pdf>

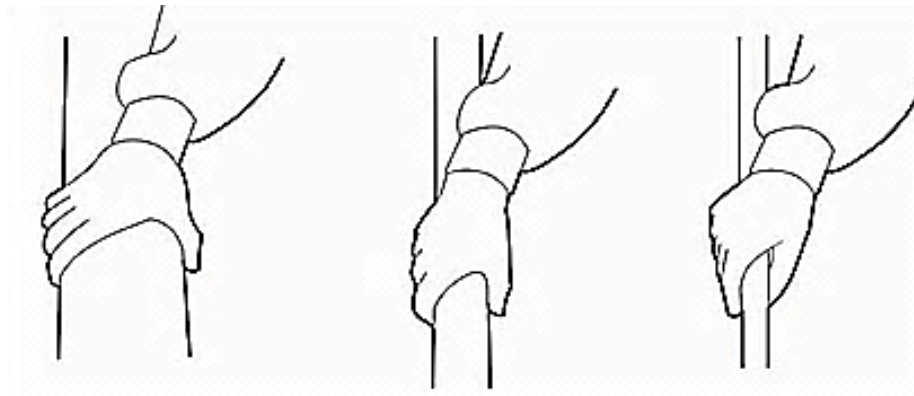


Figure 5. Example of a handrail. The image was taken from <https://eprints.uny.ac.id/63842/4/BAB%20II.pdf>

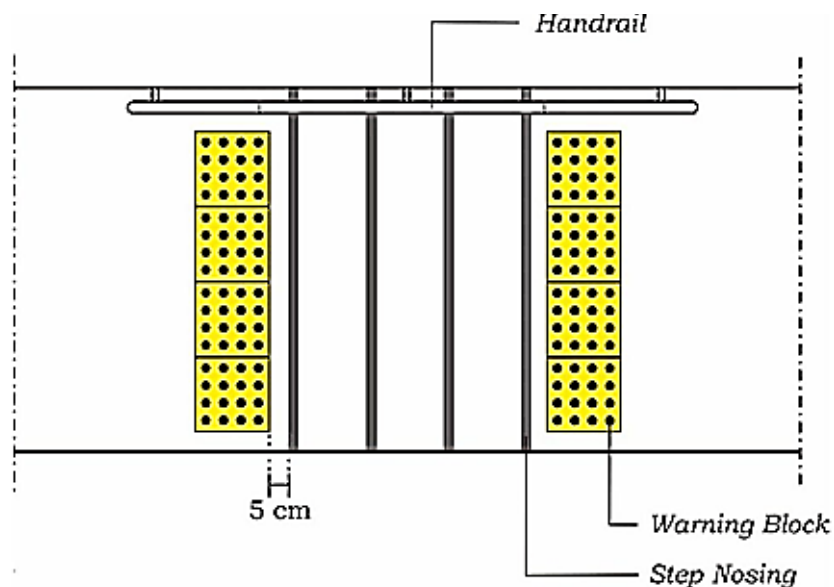


Figure 6. The horizontal cut of the handrail. The image was taken from <https://eprints.uny.ac.id/63842/4/BAB%20II.pdf>

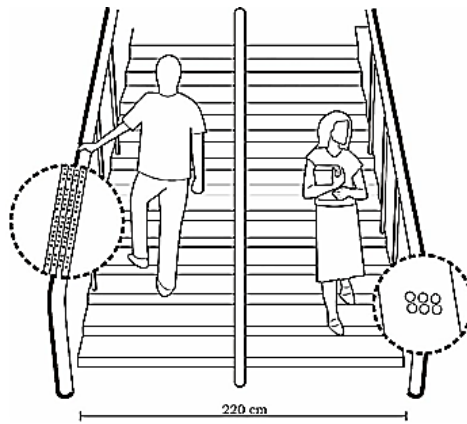


Figure 7. Stairs equipped with braille. The image was taken from <https://eprints.uny.ac.id/63842/4/BAB%20II.pdf>

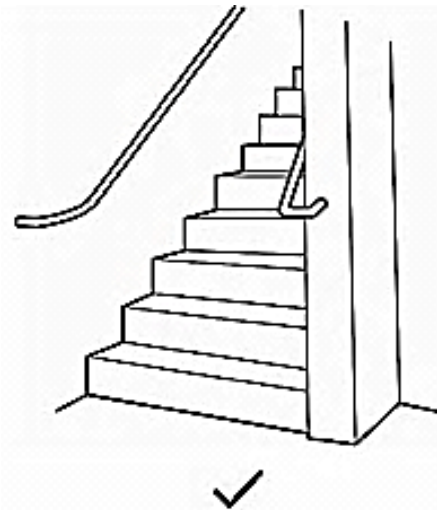


Figure 8. Example of a stairs ending pattern. The image was taken from <https://eprints.uny.ac.id/63842/4/BAB%20II.pdf>

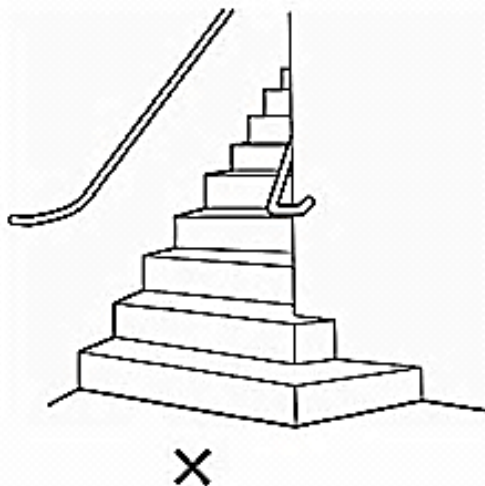


Figure 9. Examples of stair suffix patterns that cannot be used for people with special needs. The image was taken from <https://eprints.uny.ac.id/63842/4/BAB%20II.pdf>

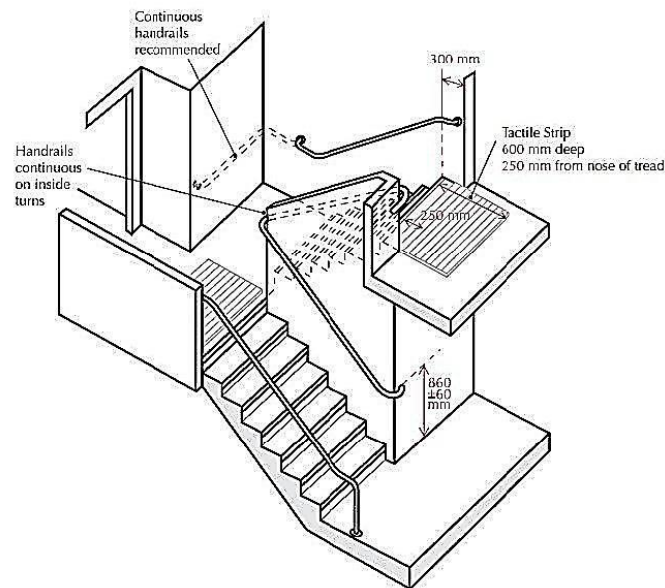


Figure 10. Recommended staircase designs for people with special needs. The image was taken from <https://eprints.uny.ac.id/63842/4/BAB%20II.pdf>

4. CONCLUSION

This study explains explain the standard for stairs for people with special needs. Detailed examples on how to design stairs were presented. This study is hopefully used as a reference and a guide for architectural and environmental construction, particularly in hospitals, schools, and public facilities for people with special needs (i.e. wheelchairs, crutches, and canes for the blind).

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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