Practical application of barrier-free environment assessment tools for houses to extend healthy life expectancy

(Research period: FY 2018–2020)

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1. Introduction

The NILIM is establishing methods for visualizing the effect of providing barrier-free facilities to suit different life stages as an itemized project to be conducted as a three-year plan from FY 2018. The objective is to quantitatively express the ease of conducting activities within the housing environment using physical activity levels called metabolic equivalents (METs) as an index to evaluate the barrier-free performance of housing. The functions that the evaluation tool should have were examined and developed last year. In the final year of this study, the practical application of the evaluation tool were conducted. This paper introduces the outline.

2. Outline of the study conducted in FY 2020

(i) Verification of the evaluation tool in actual buildings for practical application

The amount of activity by residents in an actual building was measured with a simple activity meter (HJA-750C Active style Pro [Omron]), and the results were compared with the evaluation results of the developed evaluation tool (Figure 1) to verify the tool for practical application.

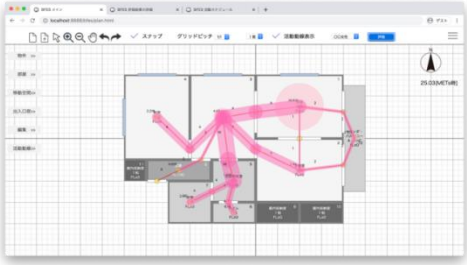

Figure 1: Barrier-free performance evaluation tool

The frequency of movement is indicated by the thickness of the line, and the amount of activity in the room is indicated by the size of the circle.

In the experiment using people as subjects for obtaining the amount of physical activity in a real building, the study used a total of 12 subjects who lived in the building to verify how different housing plans would affect the amount of physical activity in order to confirm whether the evaluation tool could evaluate the amount of physical activity in a real building. A total of six housing units were selected, including regular houses and apartments. The subjects wore simple activity meters and lived normally in the housing units (24 hours, weekdays, and holidays). The accuracy of the evaluation tool was adjusted by comparing and verifying the activity data of the meters with the calculated values of the evaluation tool.

(ii) Identification of the daily activity model of residents

A Web-based questionnaire was conducted to understand the patterns of daily life activities and the actions and behaviors of each resident attribute as a model of daily life activity (Figure 2) and to reflect them in the evaluation tool. In the screening, the target population was divided into eight age groups of men and women between the ages of 15 and 89 years, and a total of 500 responses were obtained. In this study, the population was divided into groups based on family structure, housing type, physical condition, etc., which were presented as a daily activity model.

Figure 2: Example of the daily activity model (Result of web survey)

3. Conclusion

The COVID-19 pandemic made it impossible to conduct the verification using actual buildings outside of the research facility. The research methods were thus reevaluated, and measurements were taken at the homes of the subjects by increasing their numbers. As a result, the study team believes that the initially expected results were achieved. The study will now move on to the examination of how the tool will be put into actual uses in society and spread its uses.