

# Study for the social application of the draft manual for maintaining health in evacuation shelters

(Research period: FY 2020–2021)

HIRAMITSU Atsuo (Ph.D. in Engineering), Head, YAMAGUCHI Hideki (Ph.D. in Engineering), Senior Researcher, Equipment Standards Division, Building Department

*Keywords: Evacuation shelter, health, safety, building facility*

## 1. Introduction

In previous earthquakes, it has been found that methods to improve the living environment of evacuation shelters are necessary to prevent health damage, including damage to mental health, and to ensure safety when people stay in evacuation shelters for a long period of time. Therefore, the department conducted the "Development of Repair Technologies for Facilities to Ensure the Health and Safety of Disaster Victims in Evacuation Shelters" from FY 2017 to FY 2019. This paper introduces an overview of the results of this study and future developments.

## 2. Outline of the study

### 2.1 Evaluation of partitions with sound absorption properties

As the evacuation of disaster victims becomes more prolonged, sound problems and noise issues, such as children's voices, become apparent as the evacuees start to seek the protection of privacy and improved comfort. Therefore, the department created a prototype of a partition for an evacuation shelter that considers both the sound environment and privacy and confirmed that the partition covered with sound absorption material reduces the sense of clamor by shortening the reverberation time in a gymnasium.

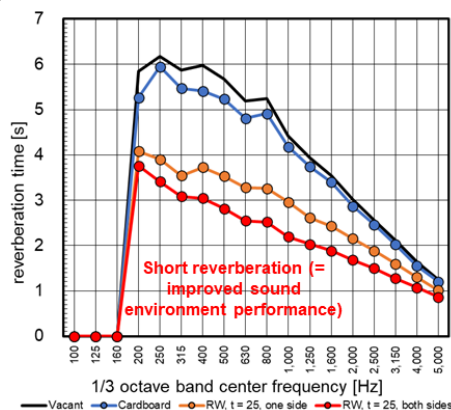


Figure 1: Example of reverberation time prediction calculation in a gymnasium with partitions

### 2.2 Proposal of a lighting method that achieves both security and better sleep environment

For lighting in evacuation shelters, lighting for evacuation and crime prevention purposes and lighting suitable for sleeping are required, but the brightness required for these conflicts. Therefore, the team developed an indirect lighting fixture that can be temporarily installed and checked the degree of glare during sleep based on the luminance distribution and the security function based on the illuminance distribution through actual measurement and simulation.

When the ceiling light is on      When indirect light is on

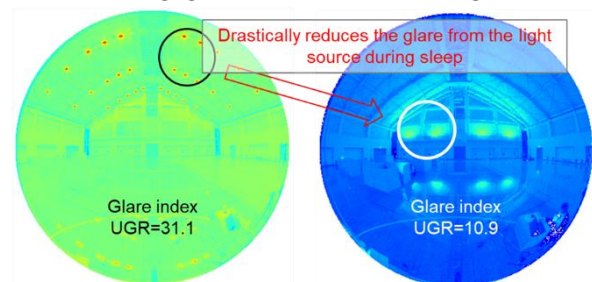


Figure 2: Examination of glare reduction effects of different lighting methods

### 2.3 Preparation of a draft manual for facility planning to ensure the health at evacuation centers

Specific methods for securing the living environment in evacuation shelters were organized through interviews with local governments and exchanges of opinions with academic societies etc., and a draft facility planning manual was prepared. The main contents of the report are setting up the target level for assuring health, summary of areas available to evacuees, and specific ways to secure facility functions to deal with lifeline disruptions. The report also describes an example of equipment capacity and cost estimation.

## 3. Future prospects

New issues have arisen regarding the response to issues, such as the COVID-19 infection, and other diseases. The basic policy is to avoid crowds, which will also be effective in improving the living environment of

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shelters, as described above. The effective use of evacuation shelter facilities and equipment plans will be organized. Also, a *Manual on Facility Planning to Maintain Health in Evacuation Shelters* (draft) will be prepared as a specific and effective reference for setting up evacuation shelters for municipalities to use, which will then be published on the website and other channels.