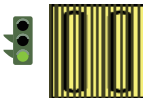
Creating installation guidelines for tactile ground surface indicators (braille blocks) for the visually impaired

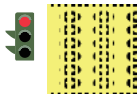
1. Background and goals

Tactile ground surface indicators for the visually impaired, also known as braille blocks, were invented in Japan in 1965. Since then, braille blocks have been installed not just in Japan but throughout the world. It is gratifying to see the growing number of installations, but because they have spread without clear installation guidelines and methods in place, there are currently a number of installations around the world that are dangerous, pose barriers to other pedestrians, or do not serve their intended function. Another problem is that braille blocks are being manufactured according to the unique rules of various regions, so there is a lack of design uniformity. There are even cases within Japan where specific areas are installing blocks according to local rules. This situation has made clear the necessity of establishing installation guidelines that can be used both in Japan and overseas for braille blocks to be utilized by visually impaired persons. The goal of this project is to elucidate problems related to the installation of braille blocks currently in use, prior to the establishment of such guidelines.

Braille blocks (formally, tactile ground surface indicators for visually impaired persons)



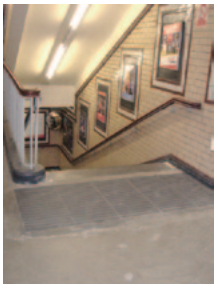
Directional block
Indicates the direction in which users can move.



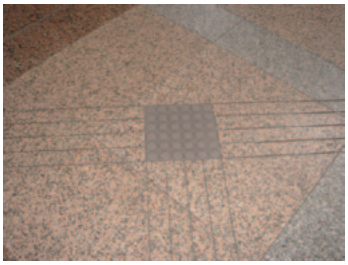
Warning block
Indicates locations where care should be taken. Examples include before crosswalks, stairs, branch points, guidance plates, and obstacles.

Figure 1. A directional block and a warning block

Brussels, Belgium



London, UK



Kuala Lumpur, Malaysia

San Francisco, USA

Figure 2. Dissimilar braille blocks

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2. Research content

Evaluation experiments were performed with visually impaired participants who are the intended users of braille blocks, and areas needing improvement were summarized. Questionnaires and interviews were also conducted to investigate the impact of braille blocks on other pedestrians (in particular wheelchair users, the elderly, stroller users, young children, etc.) and to elucidate needed improvements.

2-1. Evaluation experiments with visually impaired participants

Example where no warning block has been installed at a crosswalk entrance (Sapporo City)

Example of an overly narrow warning block (Nagasaki City)

Example of erroneous installation positioning (Nisshin City, Aichi Prefecture)

Example where no warning block is installed at an intersection of directional blocks (Saga City)

Example where no warning block is installed at an intersection of directional blocks (Toyama City)

Figure 3. Inappropriate placements of warning blocks

The evaluation experiments with visually impaired participants were conducted in order to investigate the matters that only users can evaluate, such as the placement of warning blocks before obstructions, the angle of warning blocks placed before changes in the direction of continuous directional blocks, dangers posed by blocks and rules used in only certain locales, and the necessity of installing directional blocks that indicate directions in front of intersections. Most experiments were performed using temporary braille block installations on the University of Tsukuba campus, but in some special cases experiments were performed at actual installation sites.

The following results were obtained. (1) Warning blocks should be installed in cases where the direction of directional blocks will bend with an interior angle of 135° or less. (2) Ministry of Land, Infrastructure, Transport and Tourism guidelines specifying that warning blocks should be installed 30

cm in front of potential hazards are appropriate. (3) Some blocks used in accordance with local rules are incapable of providing appropriate warnings. In particular, situations where warning blocks conforming to JIS standards are mixed with directional blocks conforming to local rules are extremely dangerous, and urgently require improvement.

2-2. Braille blocks as a barrier to wheelchair users and other pedestrians

Interviews and questionnaires were conducted with pedestrians for whom braille blocks may pose a barrier, such as wheelchair users, the elderly, stroller users, and those with small children.

In a survey of wheelchair users, 72% responded that they regard braille blocks as a barrier. In a survey of walking aid users, 85% reported that it is difficult to pass over braille blocks. One respondent reported trying to avoid braille blocks as much as possible, but in some locations, tiles are so pervasive that they are impossible to avoid.

Most stroller users (82%) reported the stroller getting caught up on braille blocks. There were also reports that the vibrations caused by passing over braille blocks are strong enough to wake a sleeping child. In a survey of guardians of small children, 50% reported cases of children stumbling and tripping over braille blocks. One respondent reported a case where a two-year-old child tripped on braille blocks, resulting in a large bump on the child's head.

The above indicates the necessity of methods for installing braille blocks that do not pose a barrier to other pedestrians.

3. Conclusions

On the basis of the results presented above, we have created Japanese and international editions of the *Guidebook for the Proper Installation of Tactile Ground Surface Indicators (Braille Blocks): Common Installation Errors* as a supplement to the installation guidelines from the Ministry of Land, Infrastructure, Transport and Tourism. We have also held information sessions at approximately 40 domestic institutions and facilities, as well as 15 overseas institutions.

In the future, we will more widely distribute the guidebook that we created, along with additional explanations as necessary. We hope to continue working toward further optimization of braille blocks, both in Japan and abroad.

Installation rules for directional blocks

- Directional blocks should be installed in locations where there are no potential hazards within 30 cm to the sides or overhead.
- Directional blocks should allow for easy recognition of indicated movement directions.
- Directional blocks should guide users to necessary locations.
- Directional blocks should maintain continuity.
- Warning blocks should not be installed before bends with an interior angle of 135° or more.
- Tiles should be of sufficient surface area to allow tactile recognition through shoe soles.

Installation rules for warning blocks

- Warning blocks should be installed in locations sufficient to allow users to stop before obstructions (30 cm in front of obstructions)
- Warning blocks should clearly indicate path branches.
- Warning blocks should allow easy recognition of the meaning of the warning.
- Tiles should be of sufficient surface area to allow tactile recognition through shoe soles.

An example of an installation improvement given in the guidebook

Directional blocks must maintain continuity. Manholes are a common reason for interrupting the continuity of directional blocks. In such situations, directional blocks should also be installed on top of the manhole.

[An example of an installation improvement]

4. Future outlook

As of April 2014, we have completed field investigations in 101 countries and regions. Braille blocks have been installed in many countries and regions, but we identified many errors in those installations. We have presented this information through reports and oral presentations at various international conferences. We have also responded to requests for advice regarding braille block installations in several countries, including Turkey and Israel. In the future, we hope to make whatever efforts we can toward worldwide unification of installation methods for braille blocks. Our book *Tenji burokku* [Braille blocks], which is based on the results of our activities at the IATSS and follow-up research, won the 2013 Mitsui Sumitomo Insurance Welfare Foundation Award.