Indoor Navigation

A discussion paper about indoor navigation methods used in indoor spaces.

1. Introduction

Wayfinding is an important tool for any indoor space. Wayfinding such as signage provides the general public with information regarding the layout of a building and provides direction to key spaces and amenities.

To accommodate the needs of people impacted by blindness and low vision to effectively navigate, this discussion paper will cover signage guidelines to enhance the overall accessibility of signage in indoor spaces. Other indoor wayfinding cues include tactile guidance systems that allow people impacted by blindness to find important amenities such as reception desks, building directories and tactile maps.

2. Indoor Navigation

2.1. Signage

To make wayfinding accessible to the general public as well as meet the needs of those impacted by blindness, signage must adhere to the following basic guidelines:

- Keep sign information short and simple. Signs that are easy to understand generate confidence.
- Be consistent in the placement of signs. For example, place signs at decision-making points along routes of travel, including entrances and exits, and mount signs at the same height throughout a building.
- Mounting heights should be appropriate for the primary occupants of a building. Lower signs may be suitable in facilities intended primarily for the use of children.
- Where lower signage is used, ensure safety-related signs are provided at both lower and standard mounting heights.
- Use typefaces, colours and graphics logically and consistently.

2.2.1 Letter Size, Type Style and Distance

For lettering, a mix of uppercase and lowercase should be used where signs are intended to be read visually and not by touch. Mixing letter casing gives words a more defined shape, making them easier to identify. Font type that is very fine or very thick can be difficult to read for people impacted by blindness and should be avoided.

For signs meant to be read through either touch or vision, use all uppercase characters. Uppercase is easier to read by touch. The maximum message length on such signs is three words. More information can be found in the section Tactile Signs.

For signs, use Arabic numerals and sans serif fonts, such as Tiresias Sign Font (i.e., a font specifically designed for signs), Ad Sans, Arial, Calibri, Franklin Gothic Medium, Tahoma or Verdana. The following table provides recommendations on the size of lettering ("character") to use depending on the height of the sign and the distance from which it will be read.

Table 1

Visual character heights for signage based on baseline character height and viewing distance – 2010 Americans with Disabilities Act Standards for Accessible Design.		
Height to finished floor or ground from baseline of character	Horizontal viewing distance	Minimum character height
1,015 mm to less than or equal to 1,780 mm	Less than 1,830 mm	16 mm
	1,830 mm and greater	16 mm plus 3.2 mm per 305 mm of viewing distance above 1,830 mm
Greater than 1,780 mm to less than or equal to 3,050 mm	Less than 4,750 mm	51 mm
	4,750 mm or greater	51 mm plus 3.2 mm per 305 mm of viewing distance above 4,570 mm
Greater than 3,050 mm	Less than 6,400 mm	75 mm
	6,400 mm or greater	75 mm plus 3.2 mm per 305 mm of viewing distance above 6,400 mm

2.2.2. Tactile Signs (Raised Print and Braille)

It is important for all indoor public spaces such as workplaces, large meeting venues such as convention centres, airports and hospitals to include tactile signs (raised print and braille) as part as their wayfinding system

A good example of a sign beside a doorway. The sign provides the same information in print (uppercase and lowercase letters with good contrast to the background), braille and raised print.

A tactile sign is any sign that can be read by touch. Braille raised print and raised symbols or pictograms are examples of tactile elements used on signs. Doors and openings that lead to public spaces should be identified by tactile signage.

The most effective location for a tactile sign is on the wall on the latch side of a door or opening. It should be consistently placed with its centre line 1,500 mm above the floor and its closest edge 140 – 160 mm from the doorjamb. Lower mounting heights may be appropriate in facilities intended primarily for the use of children or people of short stature. If wall space is not available adjacent to a door latch, mount the sign on the nearest adjacent wall. A clear wall area spanning at least 75 mm should surround the sign. With double doors of any kind, signs should be placed at both sides of the doors.

2.2.3. Raised Print Signs

Raised print signs are useful for people who are blind or for people whose remaining vision is sufficient to allow them to locate a sign but not to read it.

Some people impacted by blindness, especially those born with little or no vision, may not know what print looks like and may be unable to read raised print. For this reason, all raised print signs should be accompanied by uncontracted braille.

Raised print signs should be mounted with their centre lines 1,500 mm above ground level, located in a place where they can be touched without causing an obstruction.

Characters on a raised print sign should be 0.8 – 1.5 mm higher than the surface of the sign. The edges of the characters should be gently rounded. Avoid half-rounded or stylized characters.

Characters should be in sans serif font, 16 – 50 mm in height. Pictograms and symbols should be larger.

Example of a restroom signage. The sign includes tactile icons, letters and braille underneath the tactile restroom lettering.

If the sign is to be read only by touch, use all uppercase tactile characters. It's easier to read uppercase by touch than a combination of uppercase and lowercase.
Ideally, raised print signs are colour contrasted to the surrounding surface. Avoid raised borders around raised characters unless the border is at least 75 mm from the characters.

2.2.4. Braille Signs

Braille signage is essential for accessibility of information to individuals who exclusively use braille.

Use braille signs consistently to identify key features in the built environment. Use uncontracted braille for signs that have 10 words or less and contracted braille for signs with more than 10 words.

Raised print characters should be accompanied by uncontracted braille. Braille dots should have a dome or rounded shape for easy recognition.

Refer to these recommended ranges for braille signage:

- Braille dot base diameter: 1.5 mm
- Braille dot height: 0.6 – 0.8 mm
- Distance between any two dots in the same cell (centre-to-centre): 2.3 – 2.5 mm

- Distance between corresponding dots in adjacent cells (i.e., centre-to-centre): 6.1 – 7.6 mm
- Distance between corresponding dots from one cell to the cell directly below (i.e.,centre-to-centre): 10 – 10.1 mm

Braille should be located directly below or adjacent to the corresponding print and separated from it by at least 10 mm. If the text is on multiple lines, the braille equivalent should be placed below the entire print text.

Measured from the baseline of the braille text, braille should be located a minimum of 1,015 mm and a maximum of 1,525 mm above floor level to ensure a reader never has to bend over to touch braille type.
An exception to this recommendation is braille used in elevator controls, as the size of the control panel may vary depending on the number of floors.

Photo example illustrating dimensions of braille (dimensions and technical specifications of braille described in text) Source: Braille Literacy Canada, 2016

Braille signs can be challenging to read if they are mounted vertically. Mount them ideally 5 to 10 degrees from horizontal.

Use an uppercase letter in braille signage only under these conditions:

- The first word of sentences
- Names and proper nouns
- Indicating individual letters of the alphabet
- Initials or acronyms

2.2.5 Electronic Signs

Dynamic signage is being used increasingly within built environments, replacing traditional signs with liquid crystal display (LCD) monitors and LED displays. Refreshable digital screens are being used for many types of signs, including building directories, elevator call systems, room identification/information signs and stop identification signs within transit vehicles.
The dynamic nature of the information provided by digital signs presents many challenges for people impacted by blindness. As with any sign system, information presented visually should also be made available in an alternative format such as audio or tactile information.

The design requirements for electronic signs are no different from those of traditional signs that are read through sight. The technical requirements presented above are equally applicable to electronic signs.

Furthermore, the effectiveness of LED signage will depend on the colours chosen and the angle of the sign relative to the general lighting of the area. To achieve the best contrast, use LED signs that are white, yellow, green or light blue on a black background. Avoid using red on a black background, which is unreadable on LED signs for most people impacted by blindness, particularly those who are colour blind.

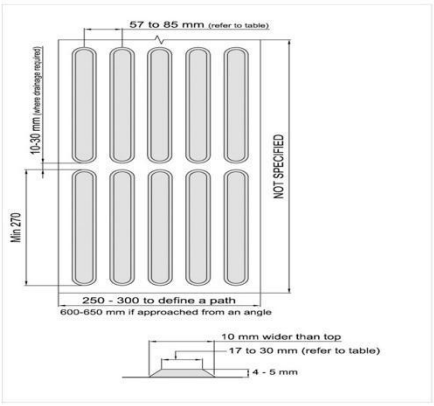
A guidance TWSI consisting of elongated bars arranged in a linear pattern to guide those who are visually impaired to important amenities within a building.

3. Guidance Tactile Walking Surface Indicators

TWSIs, also known as detectable warning surfaces or tactile attention indicators, are standardized walking surfaces that convey information to people impacted by blindness through texture and, occasionally, sound.

Guidance TWSIs (also known as wayfinding TWSIs) provides information about the direction of travel through open spaces. They are designed to guide a person on a designated path of travel. Guidance TWSIs can be built directly in ground surfaces both indoors and in outdoor environments. Guidance TWSIs act as a cane detectable guide for people impacted by blindness and low vision to navigate complex spaces.

Guidance TWSIs should consist of a pattern of parallel, flat-topped, elongated bars that extend in the direction of travel. They should be configured in a way in which those impacted by blindness can follow and should lead to important amenities such as stairs, elevators, reception desks and other types of communication services.



A drawing of guidance TWSIs showing dimensions (described in text)

Below is a list of specifications for guidance TWSIs:

- Where installed to define a route, their width should be 250 – 300 mm.
- Where installed across a route as an indicator of an amenity or diverging route, their width should be 600 – 650 mm.
- They should have a minimum continuous clearance of 600 mm on both sides.
- The height of the bars should be four to five mm.
- The top of the flat-topped elongated bars should have a width between 17 and 30 mm.
- The bars should be colour contrasted to surrounding surfaces to make them easily identifiable by people with low vision.
- The width of the base of the bars should be 10 mm (+/- 1 mm) wider than the top.
- The top length of the bars should be at least 270 mm. If drainage is a concern, a space of 10 – 30 mm should be provided at the ends of the bars.
- The spacing between adjacent flat-topped bars should be adjusted depending on the size of the bars, as shown in the table below. The larger the individual bars, the more distant the space between them.
- Attention TWSIs should be used along tactile guidance paths to identify turns and other decision-making points. The attention TWSIs should be configured in a square pattern centred on the guidance TWSIs, with each side of the square being 600 mm - 650 mm.

Table 2

A table showing the spacing between the flat-topped bars, based on the top width of the bars.

Top width of flat-topped bars (mm)	Spacing between the centre of adjacent bars (mm)
17	57 to 78
20	60 to 80
25	65 to 83
30	70 to 85