

## **Position Statement on the Design, Use, and Implementation of Tactile Walking Surface Indicators also known as detectible warning Surfaces**

Issue:

Paths of travel are being made with zero grade to facilitate mobility making it difficult for people to detect with a mobility cane, through the soles of footwear and with any remaining vision. This is creating a situation where people who are not able to tell when they are approaching a point of potential danger are at risk.

Desired Outcome:

That detectable warning surfaces be used consistently to help people with sight loss determine the safe path of travel. They are also to be safety yellow to make it easy to tell where the edge of a road, platform or any other potential transitions put a person at risk.

Present Situation:

There is no consistency how a TWS is installed. And there are other colours being used that are not as effective as safety yellow.

CAG-TCCDDV Recommendations:

That city planners adopt safety yellow for all TWS installations and that they be used consistently and effectively.

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## **Issue**

The ability to move safely about one's environment with ease and confidence is essential for full participation in the community. Many people who are blind, deafblind, or partially sighted use information available from the natural and built environment such as acoustics, tactile information and visual information to assist with wayfinding.

Tactile walking surface indicators (TWSIs), also known as Detectable Warning Surfaces (DWS), are one form of wayfinding that can assist people with vision loss to travel independently in both familiar and unfamiliar spaces. DWSIs provide information to assist people with vision loss detect hazards such as curbs, platform edges, stairs, moving walkways and other potential hazards; while TWSI's facilitate way-finding by making paths of travel easily detectible – thus enhancing a person's ability to travel safely and with comfort throughout their community.

## **Background**

TWSIs are standardized walking surfaces. When used as a system in a logical and sequential manner, TWSIs convey information regarding the environment to people with vision loss. The information is provided through the use of texture and colour contrast. The textured TWSIs must be detectable under foot and through the use of a mobility cane.

The use of colour contrast between the TWSIs and surrounding or adjacent surfaces enhances a person's ability to visually detect the TWSIs. TWSIs may be used in outdoor settings and indoor settings throughout the built environment where there are insufficient cues for wayfinding. And DWSs are used at potential hazards.

TWSIs can be made of different material such as, cast iron, concrete, plastic, stainless steel, brass etc. TWSIs can be "discrete" individual units or a precast slab with TWSIs imbedded as integrated units.

There are two types of TWSIs:

- **Attention** TWSIs, sometimes called warning or attention TWSIs, call attention to key hazards, such as the start (top) of a staircase or a platform edge in a subway or train station or at blended curbs. These are to be safety yellow in colour, because it is understood that safety yellow conveys a warning and yellow has the highest degree of conspicuity in most environments and lighting conditions.
- **Guidance** TWSIs, also known as wayfinding or guidance TWSIs, provide information about the direction of travel through open spaces. Guidance TWSIs are designed to guide a person on a designated path of travel.

Attention and guidance TWSIs can provide useful information that enables people who are blind, deafblind, or partially sighted to travel with greater efficiency, confidence, and independence throughout their communities.

The right of persons with disabilities to have equal access to the physical environment is set out in the United Nations Convention on the Rights of

Persons with Disabilities (CRPD), which the Canadian Government (with the support of all provinces and territories) ratified in March 2010. Article 9 of the CRPD states, in part, that “States Parties shall take appropriate measures to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation, to information and communications, including information and communications technologies and systems, and to other facilities and services open or provided to the public, both in urban and in rural areas.”<sup>1</sup>

The appropriate design, use, and implementation of tactile walking surface indicators and Detectible Warning Surfaces is necessary to ensure equal access for people with vision loss to the physical environment. The organizations listed below have endorsed the following recommendations concerning attention and guidance tactile walking surface indicators.

## **Recommendations**

### **General Principles**

Wayfinding can be achieved through good design of facilities, including clear accessible paths of travel with built and natural guiding elements, such as edges and surfaces that can be followed tactually and visually. TWSIs are not a substitute for poor design.

TWSIs should be installed where no built or natural guiding elements exist. As with many disability specific accommodations, TWSIs can benefit others by creating easily identified paths of travel or alerting pedestrians to possible hazards. The installation of TWSIs should take into consideration the abilities of all people.

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<sup>1</sup> See the UN Convention on the Rights of Persons with Disabilities available at <http://www.un.org/disabilities/convention/conventionfull.shtml>

1. All TWSIs should:

- be easily detectable from the surrounding surface by a raised tactile profile;
- Provide visual contrast from the surrounding surface (safety yellow is the preferred colour as it has a high conspicuity profile. However, a light colour on a dark ground surface or a dark colour on a light ground surface that provides a high contrast also works effectively as long as a light reflectance value, LRV, of 70% or greater is used in all conditions);
- be slip resistant;
- be used in a logical and sequential manner;
- be installed consistently so that they may be easily interpreted by pedestrians;
- include beveled edges so as to reduce the possibility of tripping;
- employ a texture that can be felt underfoot and be detectable with a long cane;
- Be recognizable as either attention TWSIs or guidance TWSIs.

### **Attention TWSI Recommendations**

2. Attention TWSIs must consist of circular, truncated domes installed on a walking surface.
3. The truncated domes should be arranged in a square grid and must extend across the full width of an accessible path of travel when approaching a hazard.
4. Safety yellow must be the colour used, because it has the highest degree of conspicuity in most conditions and it is also understood that yellow is used as a warning.
5. Attention TWSIs must have the following specifications:
  - The height of the flat-topped domes should be 4 to 5 mm. In an indoor environment with exceptionally smooth surfaces a 4-mm

height is preferable as the TWSIs are easier to detect. When surrounded by a rough surface such as brick or brushed concrete, a 5-mm height is preferred.

- The diameter of the top of the truncated domes should be between 12 and 25 mm. Systematic research indicates a top diameter of 12 mm is the optimal size for people with vision loss to detect and distinguish through the soles of their shoes.
- The diameter of the lower base of the flat-topped domes should be 10mm +/- 1mm more than the diameter of the top.
- The distance between the bases of adjacent domes should be a minimum of 15 mm.
- The spacing between adjacent flat-topped domes should be adjusted depending on the size of the domes, as shown in the table below. The larger the individual domes, the farther the space between them:

<u>Top diameter of flat-topped domes (mm)</u>	<u>Spacing between the centres of adjacent domes (mm)</u>
<u>12</u>	<u>42 to 61</u>
<u>15</u>	<u>45 to 63</u>
<u>18</u>	<u>48 to 65</u>
<u>20</u>	<u>50 to 68</u>
<u>25</u>	<u>55 to 70</u>

5. Attention TWSIs should be used at the following locations:

- Platform edges
- Marina dock edges
- The edges of reflecting pools and fountains that are unprotected at ground level.
- The top of stairs – including at the top of the stairs at mid-flight landings when there is a doorway leading on to the landing
- Both sides of ground-level railway crossings
- Blended curbs including medians and islands that are used to separate lanes of vehicular traffic

- At the beginning of moving walkways (such as those used in airport terminals)
- At intersecting paths where guidance TWSIs are used

## **Implementation Recommendations for Attention TWSIs**

Train platforms marina docks and reflecting pools: When attention TWSIs are used on platforms and marina docks, they must begin 610 millimeters before the drop-off, running the full length of all unprotected platform/dock edges that border the drop-off.

Stairs: at stairs, attention TWSIs should commence one tread step before the nosing at the top step, and they should be as wide as the stairs. The depth of the TWSIs used at the top of stairs should be a minimum of 610 mm.

Railway crossings: At railway crossings, attention TWSIs should be located so that the edges of TWSIs are 1.8 meters (m) minimum and 4.6 m maximum from the centerline of the nearest rail. Attention TWSIs should be installed in addition to any mechanical barriers that are activated with the arrival of trains.

Blended curbs: Attention TWSIs should be installed across the entire width of a blended curb's edge (exclusive of flares), set back 150 mm to 200 mm from the face of the curb, and extend a minimum depth of 610 mm in the direction of travel.

Attention TWSIs used on the edges of LRT/subway platforms, blended curbs, edges of docks, stairways to such facilities, railway crossings and multi-use pathways crossing paths of vehicular traffic must be safety yellow. It has been demonstrated that safety yellow has the highest level of

conspicuity although it may not have the highest light reflectance value. Note: other colours have issues that need to be considered if they are being contemplated as part of the design. For example, red tends to become muddy looking when used outside. Black can appear as a hole and blue disappears in a variety of lighting conditions.

Intersecting guidance TWSIs: Attention TWSIs should be used at the point where guidance tiles intersect. The intersecting point is called a decision-making point. The decision-making point should be 610 mm by 610 mm and comprised of attention TWSIs.

## **Guidance TWSI Recommendations**

6. Guidance TWSIs must consist of a guiding pattern constructed of parallel flat-topped elongated bars that extend in the direction of travel.
7. When guidance TWSIs are installed, the base surface should be level with the surrounding ground or floor surface so they do not create a tripping hazard. When integrated units are applied on top of existing surfaces the maximum height of the base plate should not exceed 3 mm and the TWSI should have a beveled edge.
8. TWSIs should always be adhered firmly so there is no likelihood of the edges lifting.
9. Guidance TWSIs should have the following specifications:
  - The guidance tile should be a minimum width of 250 mm wide to define a route.
  - When installed across a path of travel as an indicator of a facility or a diverging route a maximum width of 650 mm for detection should be considered.
  - The elongated bars should run in the direction of travel.
  - The guidance TWSI should have a minimum clearance of 600 mm on either side of the TWSI so that people who have vision loss do not



contact objects on either side of the wayfinding tile. A wider path of travel on either side of the guidance tile may need to be considered in certain situations for people using a mobility device.

- The minimum height of flat topped elongated bars should be 4 mm to 5 mm. In an indoor environment with exceptionally smooth surfaces a 4-mm height is recommended.
- The width of the top of the flat-topped elongated bars should be between 17 mm and 30 mm.
- The width of the base of the elongated bars should be 10 mm +/- 1 mm wider than the top.
- There should not be a space greater than 30 mm between the flat topped elongated bars.
- Where there is a risk of water ponding between the flat - topped elongated bars, a drainage gap of 10 mm to 30 mm should be provided.
- 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 farther the space between them:

<u>Width of flat-topped bars (mm)</u>	<u>Spacing between the centre of adjacent bars (mm)</u>
<u>17</u>	<u>57 to 78</u>
<u>20</u>	<u>60 to 80</u>
<u>25</u>	<u>65 to 83</u>
<u>30</u>	<u>70 to 85</u>

10. Guidance TWSIs are recommended at the following locations:

- To indicate bus/streetcar shelters
- Paths of travel in public transit stations
- Centre platforms at subway or train stations
- Routes of travel in airports
- Sports arenas/stadiums
- Large open spaces, such as public squares

- Paths of travel on sidewalks that are unusually wide or otherwise difficult to navigate

### **Implementation Recommendations for Guidance TWSIs**

Bus shelters: When used across the path (perpendicular to the line of travel) to aid in the identification of bus shelters, streetcar shelters etc. guidance TWSIs should be a minimum width of 610 mm to ensure detection.

Sidewalks, centre platforms, pedestrian routes of travel: when used along a path of travel the minimum width of 250 mm should be used. A minimum of 600 mm clear width should be provided on both sides of the guidance tile.

## Supporting Organizations

[Alliance for Equality of Blind Canadians](#)

[Alberta Society for the Visually Impaired – Edmonton Chapter](#)

[Canadian Council of the Blind](#)

[CNIB](#)

[Canadian National Society for the Deaf-Blind](#)

[Views for the Visually Impaired](#)

[Vision Impaired Resource Network \(VIRN\)](#)

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