Selected Problems of Implementation of Standards for Unified System of Tactile Indicators

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Selected Problems of Implementation of Standards for Unified System of Tactile Indicators

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Abstract. The Convention on the Rights of Persons with Disabilities is intended to allow independent functioning and full access to all realms of life to all people with disabilities. The Convention imposes an obligation on the state to ensure that all persons with disabilities have access to physical environment, means of transport, information and communication, including ICT technologies and systems, as well as other tools and services, commonly accessible or assured, both in the cities and in the countryside, on equal basis. Having this in mind, together with the voice of the persons with blindness or having greatly reduced vision, and taking into account the chaos in the markings in public space that were supposed to improve the way the persons with disabilities move, it is necessary to design and implement the adequate standards on the roads and in the streets. It is estimated that about 5% of the total country population in Poland are persons with disabilities. About 1.8 million of them are people affected by blindness, partial blindness or low vision, who at the same time are active participants of the public space and of the road traffic. However, the lack of any systemic solutions regulated by law that improve safety in the road traffic is a serious problem in enabling access to culture, as well as free and safe movement for persons with poor vision. The article presents the design failures, executive errors and an impact of the usage of the unified warning system that is obligatory countrywide for the safety of persons with disabilities in public space.

1. Introduction

According to the research data, more than 33,000 accidents occur on Polish roads every year, in which 3,000 people die and more than 40,000 are injured. Every year more than 4,300 accidents occur due to inappropriate behaviour towards pedestrians, resulting in death of almost 1,000 pedestrians each year. [3]. Statistical data of the Road Traffic Office of the National Police Headquarters reveal that although accidents involving disabled people account for only 0.1% and the collision rate is 0.03%, there are still a few people killed in road traffic. Statistics on the proportion of people with disabilities, including the blind, partially sighted and visually impaired, may be inaccurate and the number of people injured may be much higher. The reason for this may be that no information on the participation of blind people is recorded in the accident card.

A low number of accidents with the participation of blind people may also be caused by the social exclusion of blind people from public life and, consequently, a small percentage of the disabled who move in the transport space. Communication barriers for visually impaired people also include uneven pavement, pressing pavement tiles, partitions, posts or lack of designated communication corridors — i.e., leading communication paths.
It is estimated that about 5% of the country’s population are people with disabilities, of which over 0.5 million are blind, partially sighted and visually impaired people, who are also participants in public space and road traffic. The lack of any systemic solutions regulated by law that improve the safety of people with disabilities in traffic is a serious problem in making it easier for visually impaired people to access cultural assets and to move around freely and safely.

In 2012, Poland ratified the “Convention on the Rights of Persons with Disabilities”, which aims at enabling people with disabilities to function independently and participate fully in all areas of life. The Convention puts an obligation on the State to ensure that persons with disabilities have access, equally with others, to the physical environment, to means of transport, information and communication, including information and communication technologies and systems, and to other facilities and services, which are generally available or provided to the public, in both urban and rural areas.

In the meaning of ratification above, the voices of blind and partially sighted persons and the chaos that exists with regard to indicators in the public space, whose purpose is to facilitate the movement of persons with disabilities, it is necessary to develop appropriate standards that meet these requirements.

2. Improving pedestrian safety by introducing a unified system

Improving safety by introducing a unified system in accordance with e.g. DIN standards would introduce a unified system for detectable warning tiles for disabled people. Unfortunately, differences in patterns, colours, assembly errors and the lack of standardised dimensions and installation methods now cause confusion and mislead the users. The lack of developed system for naming of particular elements, i.e. warning tiles, guiding tiles or choice tiles of particular dimensions and location of the direction of protrusions makes that both the designer and often the manufacturer mark their series of product in reverse as compared to another manufacturer or distributor.

Currently, there are various guidelines used for the location of warning features in relation to the pavement, crosswalks, bus/tram stops or the road itself, but this is also not enough to be used as a uniform system in public spaces and causes numerous design and installation errors.

In November 2017, the Ministry of Infrastructure and Construction published an updated guide titled “Accessibility standards for buildings for people with disabilities taking into account the concept of a universal design”, which is based on current regulations and publications on the mobility of people with disabilities. The above publication is to be treated as a guide to good practice for designers.

3. The System of Tactile Walking Surface Indicators – TWSI

This guide presents the TWSIs – Tactile Walking Surface Indicators based on the ISO standard 21542:2011) [1, 4].

The TWSI system enables the identification of the location thanks to the use of a constant combination of colours and textures of tactile elements. The purpose of tactile indicators is to increase the spatial orientation of visually impaired people.

The system consists of the following types of textures:

- Type A – directional texture – figure 1.

Directional path tiles of dimensions 30x30cm, 30x60cm and 30x90cm, with the texture of elevated horizontal blocks, characterized by colour contrast of at least 50%.
Type B – warning (safety) texture – figure 2.
Warning field tiles of dimensions 30x30cm, 40x40cm, with truncated domes in slanted arrangement on their surface. They have a colour contrast of at least 70%.

Type C – caution (information) texture – figure 3.
Caution field tiles of dimensions 40x40cm, with truncated domes in a rectangular arrangement on their surface. They have a colour contrast of at least 30%. Warning strips shall signal when approaching a hazardous location and warn against imminent danger [5]. A guidance path consisting of a sequence of directional tiles comprising a sequence of elements enables a blind or partially sighted person to maintain an adequate direction of movement. The purpose of the caution field is to inform of a crossing or branching of guide strips of the tactile path or the change of the direction of movement.
In accordance with the guidelines of the Polish Association of the Blind (PZN) [1], the chapter titled: “Principles of placing contrast and tactile indicators in public space” defines what indicators should look like for the blind and partially sighted people at public transport stops. However, they are not a legal act. According to these guidelines, they shall be placed on the platform, starting with the curb at the track, in the following sequence (Figure 4 and 5):

- Yellow strip 150 mm wide,
- Black strip 150 mm wide,
- Anti-slip, grey surface 300 mm wide,
- A 400 mm wide warning strip made up of blisters (the shape and dimensions of the tactile elements, as well as their relative position are not specified, which is not without significance to the blind).

4. Examples of placing contrast and tactile indicators in public space

Below are examples of how to mark bus stops (Figure 4) and tram stops (Figure 5) and crosswalks according to the guidelines (Figure 6).
Figure 5. Marking of the tram stop in accordance with the guidelines [7].

Figure 6. Marking of the crosswalk in accordance with the guidelines [photo made by author].

Below are examples of how bus stops (Figure 7 and 8) and crosswalks are not complying with the guidelines (Figure 8).

Figure 7. New bus stop at al. IX Wieków in Kielce in Poland — marking of the bus stop against the guidelines [8].
Due to the lack of a uniform system of tactile marking throughout the country, each of the cities and public transport administrations develops its own marking standards, which makes it difficult for a person with disabilities to identify the place properly in different cities.

Disparate marking systems are used — products made to different technical standards from various countries, so that different products, which often do not meet their characteristics are used the market. It is not possible to distinguish any concrete tiles used from the ground by their contrast. The products have different colours, spacing and dimensions.

5. **A system of surface composite tiles consisting of LUMI FON warning tiles**

Introduction of a unified warning system for disabled people based on the system of composite surface tiles developed by LUMI brand in accordance with the latest DIN standards. The company introduces products offered under the “LUMI” brand, which meet the highest expectations of disabled people and significantly improve their safety in public spaces using contrasting colours and physical properties. The bright colours used make the elements of indicators visible to those visually impaired, but they also attract the attention of other traffic participants, who pay more attention to the sensitive places where the system is used. The physical structure of the tiles allows the blind people feeling the material difference on the surface, which makes it possible to determine more accurately their location.

An additional advantage of the “LUMI” system is the ease of installation, which allows the use of the tiles both on the newly designed surfaces of concrete slabs and cobblestones and on asphalt surfaces, as well as on the existing surfaces without the need of disassembling the substrate.

The system of composite surface tiles, consisting of “LUMI PO” warning tiles, “LUMI PP” directional guidance tiles, “LUMI PW” choice tiles, and “LUMI PA” anti-slip tiles, fully solves the disparate ways of marking of warning places for the blind and partially sighted people in our country [2].

6. **Conclusions**

Disparate marking systems are used in Poland — products made to different technical standards from various countries, so that different products, which often do not meet their characteristics are used the market. The authors suggest the use of products offered under the “LUMI” brand. They meet the highest expectations of disabled people and significantly improve their safety in public spaces using contrasting colours and physical properties. The bright colours used make the elements of indicators visible to those
visually impaired, but they also attract the attention of other traffic participants, who pay more attention to the sensitive places where the system is used. The physical structure of the tiles allows the blind people feeling the material difference on the surface, which makes it possible to determine more accurately their location.

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