

	<p>TECHNICAL STANDARDS DETAILED TECHNICAL CONDITIONS FOR THE CONSTRUCTION OF THE RAILWAY INFRASTRUCTURE OF THE SOLIDARITY TRANSPORT HUB – DESIGN GUIDELINES</p>	<p>CENTRALNY PORT KOMUNIKACYJNY – SOLIDARITY TRANSPORT HUB POLAND</p>
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TECHNICAL STANDARDS

**DETAILED TECHNICAL CONDITIONS FOR THE
CONSTRUCTION OF THE RAILWAY INFRASTRUCTURE OF
THE SOLIDARITY TRANSPORT HUB – DESIGN
GUIDELINES**

VOLUME VIII.4

STRUCTURAL LANDSCAPING

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The list of volumes constituting the detailed technical conditions for the construction of the railway infrastructure of the Solidarity Transport Hub:

Volume A	Introduction to the STH railway standards
Volume I.1	Railway track – layout geometry
Volume I.2	Railway – design of civil structures
Volume I.3	Railway track – drainage of track layout
Volume I.4	Railway track – gauge
Volume I.5	Railway track – geotechnical investigations and design
Volume II.1	2 x 25 kV 50 Hz AC overhead catenary system and traction power supply
Volume II.2	3 kV DC overhead catenary system and traction power supply
Volume III.1	Engineering structures
Volume III.2	Tunnels
Volume IV	Non-OCL power engineering
Volume V.1	Non-public roads
Volume V.2	Public roads
Volume VI.1	Control command and signalling – basic equipment
Volume VI.2	Control command and signalling – European Train Control System (ETCS)
Volume VII.1	Fixed and wireless communication systems and data transmission
Volume VII.2	Telecommunication systems and telematics
Volume VII.3	Detection of rolling stock failure conditions (DSAT)
Volume VIII.1	Station and railway station buildings
Volume VIII.2	Technical buildings
Volume VIII.3	Structures
Volume VIII.4	Structural landscaping
	Specifies quantitative and qualitative requirements to be used when designing and developing the platforms with equipment in the form of structural landscaping facilities.
Volume IX	Measures to minimise environmental impact
Volume X	Conflicts with external networks
Volume XI	Electromagnetic compatibility (EMC)
Volume XII	Railway line guard
Volume XIII	Technical support facilities
Volume XIV	Health and safety support systems for people and property
Volume XV	Survey control
Volume XVI	Railway rolling stock
Volume XVII	Automatic baggage check-in systems
Volume XVIII	Security, protection and cybersecurity integrity requirements

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1 Introduction

This volume VIII.4 of the Technical Standards – Design Guidelines is one of 30 volumes containing a description of detailed technical conditions for the construction of railway lines up to a speed of ≤ 350 km/h.

1.1 Technical scope – introduction

The basic element supplementing the functionality of facilities related to the traveller service using railway services is structural landscaping. Structural landscaping is commonly referred to as a complex of small civil structures used for land development, which, at the same time, are very useful elements of the area of railway station buildings and railway stations/stops.

Structural landscaping facilities are located in the entire space of the railway station/stop and railway station building, as well as in the areas directly adjacent to them. Due to slightly different requirements related to the location of structural landscaping facilities, the standards in the scope of general requirements were divided into a group of structural landscaping facilities located on platforms and the remaining area of the railway station/stop.

Appropriately selected structural landscaping facilities affect the aesthetics and appearance of the railway area, which, depending on the land development, apart from serving travellers, constitute an important element of the public space. The structural landscaping facilities should be characterised by functionality and contribute to the enhancement of the space decorative values. Individual pieces of equipment should form a common whole. This is achieved by:

- application of uniform style for all structural landscaping facilities,
- using as few colours as possible for individual structural landscaping facilities in order to obtain a visually uniform environment,
- unifying technical condition of individual structural landscaping facilities, their colour scheme and form.

At railway stations/stops and in railway station buildings, the structural landscaping consists of umbrella roofs, benches, handrails for resting while standing, luggage stands, information boards and display cabinets, waste baskets, and lighting poles. There is also other equipment serving travellers such as clocks, monitoring cameras, dynamic information elements, loudspeakers, etc. The position of all these elements in the area of the railway station building or railway station/stop should not hinder the movement of travellers and should not make the stay and waiting for the train at the station or stop cumbersome.

According to the Construction Law, structural landscaping facilities with ornamental, utility and recreational functions (e.g. benches, waste baskets) are defined as small civil structures. In accordance with Article 29 section 1 point 22 of the Construction Law, no structural landscaping facility requires obtaining the building permit.

All newly designed structural landscaping facilities must meet the requirements of safety standards.

1.2 Links to other volumes

The links between this volume of Standards with other volumes are presented in Table 1.

Table 1

Volume No	Volume title	Relation content
V.2	Public roads	Pedestrian and communication routes
VII.2	Telecommunication systems and telematics	Clocks and passenger information system elements
VIII.1	Station and railway station buildings	Structural landscaping facilities in railway station buildings
VIII.3	Structures	Structural landscaping facilities on platforms, halls and platform umbrella roofs; Fencing

1.3 Definitions of terms used

- 1) **Outdoor planters and planters** – containers for growing plants.
- 2) **Structural landscaping facilities** – a set of small utility facilities available to the public, such as: benches, waste baskets, handrails for resting while standing, bicycle racks, outdoor planters, information boards, etc., erected as part of spatial planning.
- 3) **Typhlographic map** – a map in the form of convex signs for blind and visually impaired people.
- 4) **Passenger infrastructure facilities** – a railway station building and access to platforms, including footbridges and underpasses and railway subways, as well as platforms. The facilities also include other communication routes intended for access of travellers to the railway station building and platforms.
- 5) **Usable space zone** – space on the platform between the hazard zone and the footprint area or in other part of the railway facility that consists of space without obstacles that enables efficient and safe movement of all groups of people, among others, by ensuring its proper width.
- 6) **Footprint area** – space in the railway facility where all structural landscaping facilities should be located.
- 7) **Anti-graffiti coating** – a coating applied to structural landscaping facilities that makes it possible to remove graffiti and other paints without disturbing the original facility structure.
- 8) **Static passenger information** – a set of boards and pictograms providing permanent information.
- 9) **Unobstructed route** – a route that can be used by all travellers, including people with disabilities and reduced mobility. Such a route may include access routes or lifts, provided that they are adapted to the needs of disabled persons.
- 10) **Basic use area** – a platform area where travellers leave a train or are waiting to enter one.

2 Essential, basic and general requirements for the STH railway infrastructure

Table 2 defines the link between the detailed technical conditions and the essential, basic and general requirements for the STH infrastructure.

Table 2

sub-chapter of this volume defining detailed technical conditions	essential requirements (Directive on the interoperability of the rail system)						basic requirements	general requirements for the STH railway infrastructure			
	1.1. security	1.2. reliability and accessibility	1.3. health	1.4. environmental protection	1.5. technical compliance	1.6. accessibility	2.1. mechanical resistance and stability 2.2. fire safety 2.3. hygiene, health and the environment 2.4. safety and accessibility in use 2.5. protection against noise 2.6. energy economy and heat retention 2.7. sustainable use of natural resources	3.1. oriented towards the needs of the economy	3.2. orientation towards the needs of passengers	3.3. orientation towards the needs of carriers	3.4. compatibility with the railway infrastructure connected with the STH railway infrastructure
3.1.	-	-	1.3.1. 1.3.2.	1.4.2.	-	1.6.1.	-	-	-	-	-
3.2.	1.1.5. 1.1.12.	1.2.1. 1.2.2.	1.3.1. 1.3.2.	1.4.2.	-	1.6.1.	2.2.1. 2.4.1.	-	3.2.3. 3.2.4. 3.2.5	-	-
4.1.- 4.11.	1.1.5.	1.2.1. 1.2.2.	1.3.1. 1.3.2.	1.4.2.	1.5.1.	1.6.1. 1.6.2. 1.6.3. 1.6.4.	2.2.1. 2.3.1. 2.4.1	-	3.2.1. 3.2.3. 3.2.4. 3.2.5.	-	3.4.

Cybersecurity

Technical solutions which collect, store, process, make available or transmit data ensuring compliance with the essential requirements with respect to safety (requirements from 1.1.1. to 1.1.11. specified in Volume A of the STH railway standards) and general requirements for the STH rail infrastructure with respect to protection (requirements from 1.1.12. and 1.1.13 specified in Volume A of the STH railway standards) should be designed taking into account cybersecurity, i.e. “security of network and information systems”, which is defined in the Directive concerning measures for a high common level of security of network and information systems as follows:

“security of network and information systems” means the ability of network and information systems to resist, at a given level of confidence, any action that compromises the availability, authenticity, integrity or confidentiality of stored or transmitted or processed data or the related services offered by, or accessible via, those network and information systems;

[as defined in Article 4 of Directive 2016/1148]

Cybersecurity includes two types of threats resulting from unauthorised access to the systems/equipment/networks that collect, store, process, make available or transmit data:

- 1) physical security threats

It is necessary to secure systems/equipment/networks against direct access which could enable causing (intentionally or unintentionally) threats to functional safety.

2) IT security threats

It is necessary to secure systems/equipment/networks against logical access via IT systems/equipment/networks, which could enable causing (intentionally or unintentionally) threats to functional safety.

Cybersecurity defined this way applies both to information systems used for rail transport purposes and to operational systems used for rail transport purposes, but the STH railway standards do not include requirements for information systems, e.g. timetabling systems.

Physical security threats and IT security threats for operational systems for which requirements are defined in the STH railway standards should be addressed by railway operators as part of the risk assessment and by design engineers/manufacturers/contractors as part of threat control. Additionally, it is required for the applied protections to be documented and verified in accordance with the requirements included in Volume XVIII of the STH railway standards.

Cybersecurity within the scope of this volume of the STH railway standards

Currently, in the area covered by this volume of standards, there are no networks and information systems whose security could be endangered. However, it is possible that such networks and information systems or technical solutions that collect, store, process, make available or transmit data may arise. For example, a system of sensors may be used that, through wired or wireless networks, public or non-public networks or directly, will connect to, for instance, an infrastructure manager's system. Then, they should be protected against physical security and IT security threats in a manner compliant with the requirements of the Information Safety Management System (ISMS) implemented by the STH company.

At the same time, it should be kept in mind that the ISMS will be subject to changes because maintaining the required level of cybersecurity is not possible by meeting requirements of the standards once since cybersecurity is a process rather than a state. In order to minimise the number and magnitude of cyber threats, the requirements (obligations) mentioned in the Act of 5 July 2018 on the national cybersecurity system, in its Chapter 3 for operators of key services and in Chapter 5 for public entities, should be continuously followed in operational processes and only services of digital service providers fulfilling the obligations described in Chapter 4 of that Act should be used.

3 General structural landscaping requirements

- 1) All structural landscaping facilities, as well as all elements on extension arms (including elements on supports and suspended elements) should contrast with their surroundings and be located in places where they do not disturb the visually impaired and blind persons.
- 2) Edges of all elements likely to be approached or inadvertently impacted by a traveller should be rounded. Edges of a structural landscaping facility should be considered rounded if their radius is equal to or greater than 2 mm (PN-EN 527-2:2017).
- 3) These elements should be arranged so that they can be monitored.
- 4) Structural landscaping facilities should be made of vandal-resistant materials resistant to variable atmospheric conditions.
- 5) In case of damage to structural landscaping facilities, they should not pose a hazard to the travellers and should be easy to repair or replace.

3.1 Applied materials and paint coatings

- 1) Materials used in structural landscaping facilities should be durable, functional, aesthetic, as well as easy to maintain in cleanliness and maintain.
- 2) Protection of wooden elements should ensure the durability of coatings exposed to weather conditions of at least 5 years.
- 3) Metal elements' protection should protect against corrosion, e.g. by application of powder paint (lacquer) or use of elements made of stainless steel, acid-resistant steel, polished steel, brushed steel or galvanised sheets.
- 4) It is recommended that elements exposed to frequent touching by travellers be made of anti-bacterial materials or be coated with anti-bacterial coatings.

Example material requirements applicable to individual structural landscaping facilities are presented in Table 3.

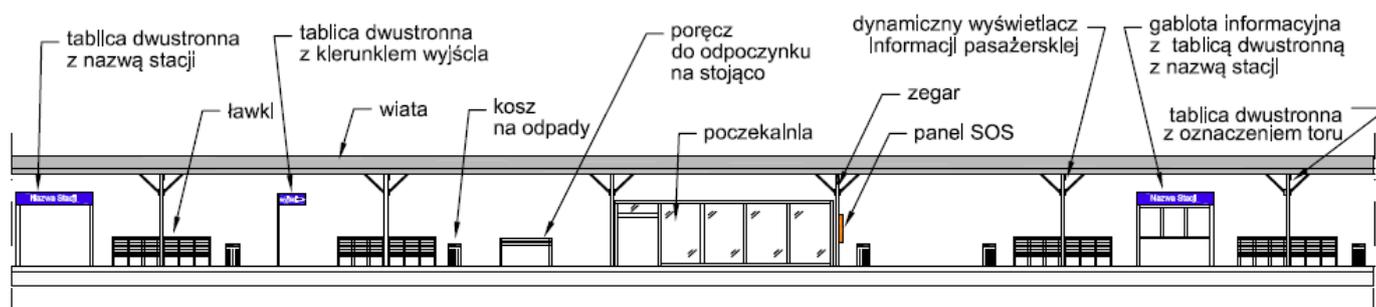
Table 3

Material requirements applicable to individual structural landscaping facilities

Item	Structural landscaping facility	Material requirements
1	Tylographic information elements (touch maps)	Typhlographic plan made: - in perforation technique – plexiglass or stainless steel, - in milling technique – aluminium or brass.
2	Boards and display cabinets	Powder coated steel and cast iron
3	Clocks	Powder-coated enclosure, IK degree of mechanical strength defined by the requirements of EN 60208/EN 50102; for clock enclosures used outside – not less than IK07, for clock enclosures used inside – not less than IK06.
4	Benches	Frame – powder-coated steel, seat – oiled exotic wood.
5	Waste baskets	Made of transparent plastic or in the form of a powder-coated steel mesh container.
6	Handrails for resting while standing	Polished steel
7	Luggage stands	Polished steel
8	Bicycle racks	Powder-coated steel and cast iron or polished steel
9	Lighting poles	Powder coated steel and cast iron

3.2 Arrangement, colour scheme, contrast

- 1) **Arrangement of structural landscaping facilities.** The arrangement of structural landscaping facilities is considered in relation to the railway station building and its surroundings and platform. The rules of arrangement of structural landscaping facilities must take into account:
- locations not colliding with other infrastructure, e.g. unobstructed route, touch guide paths, linear drainage, inspection chambers and drainage and telecommunication manholes;
 - ease in maintaining their cleanliness;
 - repairs.
- a) **Railway station building and its surroundings.** The structural landscaping facilities should be:
- aesthetically made, matching the architectural and urban development plan, adopted in the design;
 - arranged in such a way as not to endanger moving travellers;
 - located in designated zones;
 - located next to pedestrian routes;
 - located outside unobstructed routes;
 - permanently attached to the substrate;
 - made of vandal-resistant materials;
 - located so as not to limit the possibility of mechanical maintaining of cleanliness and, in the case of structural landscaping facilities located outside the railway station building, the possibility of mechanical snow removal in the winter period.
- b) **Platforms.** Structural landscaping facilities located on platforms should be:
- placed on the platform depending on its type, i.e. whether it is one-side platform (the platform supports one track) or island platform (the platform supports two tracks). In the case of one-side platform, the structural landscaping facilities should be located as far from the platform edge as possible, and in the case of island platform, they should be located in the centre of the platform. It is recommended that the standing structural landscaping facilities (benches, waste baskets, display cabinets, automatic units, poles) are placed along one line;

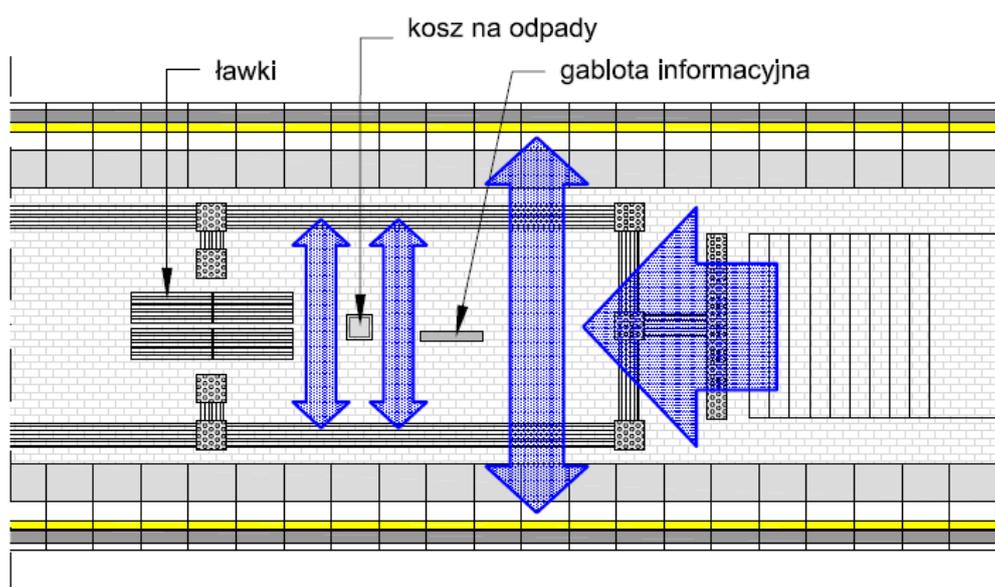


PL	EN
tablica dwustronna z nazwą stacji	double-sided board with station name
Nazwa Stacji	Station name
ławki	benches
tablica dwustronna z kierunkiem wyjścia	double-sided board with exit direction
wiata	umbrella roof
kosz na odpady	waste basket
Poręcz do odpoczynku na stojąco	Handrail for resting while standing
poczekalnia	waiting area
zegar	clock
panel SOS	SOS panel
dynamiczny wyświetlacz informacji pasażerskiej	dynamic passenger information display

gabłota informacyjna z tablicą dwustronną z nazwą stacji	information display cabinet with a double-sided board with the station name
tablica dwustronna z oznaczeniem toru	double-sided board with track marking

Figure 1. Example of equipping a platform with structural landscaping facilities

- when arranging structural landscaping facilities on a platform, free space should be provided around them to ensure efficient movement of travellers;
- all platform equipment should be arranged in such a way that it does not create alleys hindering their monitoring;
- regardless of the platform type, an unobstructed route with a width of at least 1600 mm, in which it is not allowed to locate any obstacles and structural landscaping facilities, should always be provided. Reduction of the minimum width of the unobstructed route is possible only upon the consent of STH.



PL	EN
ławki	benches
kosz na odpady	waste basket
gabłota informacyjna	information display cabinet

Figure 2. Example of leaving free space near structural landscaping facilities on an island platform

- all structural landscaping facilities, as well as all elements on extension arms, should contrast with their surroundings (background and surface),
 - in the case of larger surfaces, structural landscaping facilities should not hinder mechanical maintenance of cleanliness;
 - it is essential to avoid placing structural landscaping facilities so as to create places facilitating the accumulation of waste and contaminants, e.g. in the structural profiles of benches placed back-to-back;
 - structural landscaping facilities should be made of vandal-resistant materials resistant to variable atmospheric conditions.
- 2) Equipping the platform with structural landscaping should be adopted depending on the number of train stops per day and the size of the served travellers' flow. With reference to such rules, the

required equipment in the form of structural landscaping facilities has been specified for Polish railways.

- 3) For railway stations/stops where the planned number of train stops is:
- a) **below 10 trains/day** or planned traveller service is **below 100 travellers/day**, platforms should be equipped with at least:
 - one umbrella roof with seats in the basic use area;
 - four seats under the umbrella roof for each platform edge;
 - two waste baskets on each platform, including one waste basket at the route to entrance to/exit from the platform;
 - two bicycle racks for each platform edge; racks should be located outside the platforms; where possible, racks should be placed at each path to the platforms;
 - additional equipment depending on the location (railings, fencing, etc.).
 - b) **from 10 to 70 trains/day** or planned traveller service is **from 100 to 1000 travellers/day**, platforms should be equipped with at least:
 - two umbrella roofs with seats or one sector umbrella roof in the basic use area;
 - four seats under the umbrella roof and one handrail for resting while standing should be provided for each platform edge, for each approx. 40 m of available platform length – in the basic use area (taking into account the equipment of the umbrella roofs with seats);
 - two waste baskets for each approx. 100 m of available platform length, including at least one waste basket near the entrance to/exit from the platform in the basic use area;
 - five bicycle racks, for each platform side; racks should be located outside the platforms; where possible, racks should be located at each path to the platforms;
 - additional equipment depending on the location (railings, fencing, etc.);
 - c) **not less than 70 trains/day** or planned service is **more than 1000 travellers/day**, platforms should be equipped with at least:
 - one sector umbrella roof with wind protection walls of a length of not less than half of the basic use area;
 - six seats and one handrail for resting while standing should be provided for each platform edge, for each approx. 40 m of available platform length – in the basic use area (taking into account the equipment of the umbrella roofs with seats);
 - three waste baskets for each approx. 100 m of available platform length, including at least one waste basket near the entrance to/exit from the platform in the basic use area;
 - five bicycle racks, for each platform side; racks should be located outside the platforms; where possible, racks should be located at each path to the platforms;
 - additional equipment depending on the location (railings, fencing, etc.).
- 4) The basic dimensions related to the arrangement of the structural landscaping facilities on the platform are presented in Table 4.

Table 4

Basic parameters related to the arrangement of structural landscaping facilities

Item	Parameter	Value
1	Minimum waste basket offset from the bench	1.0 [m]
2	Offset of the remaining structural landscaping facilities away from each other	0.8 [m]
3	Minimum height at which a structural landscaping facility may be suspended, measured from the bottom edge to the platform surface	2.4 [m]
4	Minimum radius of rounded edges of structural landscaping facilities	0.002 [m]
5	Minimum distance between the platform edge and the structural landscaping facility	2.75 [m]
6	Minimum distance of a structural landscaping facility from hazard zone boundary	1.75 [m]

Item	Parameter	Value
7	Minimum distance of walls, lifts, stairs from the hazard zone boundary	1.9 [m]
8	Minimum distance of walls, lifts, stairs from the platform edge	2.9 [m]

4 Structural landscaping elements

4.1 Passenger information elements

- 1) In passenger infrastructure facilities, information, warning, prohibition, order and safety markings must be designed and consistent with applicable European and national regulations.
- 2) All information provided throughout the passenger infrastructure area should be consistent. The information must be of the same design, unified and clearly defined, both in the area of the railway station building, platforms and at the patch to platforms.
- 3) Information and markings should be available at all points where the traveller has to decide on the selection of the route, at a spacing of a maximum of 100 m on an unobstructed route, consistently along its entire length.
- 4) Written information should be given in lower and upper case letters. Top and bottom indexes should not be used.

4.1.1 Visual information elements: boards, display cabinets, displays

1) Boards

In passenger infrastructure facilities, information and information, safety and directional markings are to be put on boards.

a) the following types of boards are distinguished:

- with the name of the station/passenger stop (free-standing, suspended);
- with the name/numbers of platforms, tracks and sectors (free-standing, suspended);
- information boards such as: boards indicating the direction of trains, exit/entrance, an indication of the unobstructed route, access to other facilities;
- information boards on the area of the railway station building and platforms,

b) on the platform, boards with the names of stations or stops should be located at the end and beginning of the platform and outside the platform at a distance of:

- up to 200 m from platforms (recommended distance is from 150 to 200 m);
- at least 10 m from the axis of the extreme track in order to enable travellers to get to know which station/stop they approach,

c) it is recommended to use double-sided boards at the beginning and end of the platform located perpendicular to the track axis or at an angle of 30/60 degrees in order to enable inscription legibility. In front of the platforms, the boards should be placed along the railway line at an angle enabling the best visibility for passengers in trains,

d) the board with the name of the station/stop should have the following height:

- 700 mm, located: at the end and beginning of the platform (perpendicular to the tracks) and on the platform at the end and beginning of the basic use area (parallel to the tracks) at least every 100 m outside the basic use area;
- 300 mm, located along the platform (parallel to the tracks) at least every 50 m in the basic use area,

e) it is recommended to use double-sided boards on the platform and outside it. The length of the board depends on the length of the inscription with the name of the station/stop,

f) the boards with platform/track marking should be located only at the entrances to the platform so that the traveller can identify the appropriate platform number and track number. These boards should be installed perpendicular to the track axis with a number from the side of the described edge. In the case of platforms on single-track line stops, it is allowed not to describe the number of platform and track,

-
- g) platforms with an edge useful length of more than 200 m should be divided into sectors. The length of the sector should not be longer than the length of three train cars.
Sector marking boards should be placed in alphabetical order as close as possible to the tracks above the edge of the platform,
 - h) direction boards indicating the direction of the train travel should be located on platforms or on access paths to the platform. It is allowed to connect the direction board with the boards indicating the route to the platform,
The direction board should indicate the direction of the city with the nearest larger station. It is possible to indicate more than one city in a given direction on one board,
 - i) the entrance and exit marking boards should be placed above the main entrances to the passenger infrastructure facilities, leading directly from the railway station building to the platforms. Exit boards should also be used to identify the exit from platforms and railway subways. These boards are used on platforms to indicate the direction to the unobstructed exit. Boards indicating the access path to the passenger infrastructure area should be provided. The following pictograms should be placed on the board: "station/stop/platform" or indicating the number of the platform to which the route leads, including the length of the access path. Boards in railway subways and on footbridges may contain street names and information on platform numbers, station and external services,
 - j) the boards should be permanently fixed to the wall or substrate (free-standing). It is recommended to install boards on infrastructure elements, such as umbrella roofs, buildings, structures, poles,
 - k) information boards should be placed at a height ensuring visibility for travellers. The minimum distance between the lower edge of the board and the surface of the platform/access path and for boards with the name of the station/stop located in front of the entry to the passenger infrastructure area is 2400 mm.
 - l) the boards may be illuminated (LED illumination along the side edges) or not illuminated,
 - m) it is not allowed to combine information and direction systems on boards with advertisements.
- 2) Display cabinets:
- a) in passenger infrastructure facilities, it is recommended to use information display cabinets, i.e. containing timetables and information with pictograms in a form of a poster and an inscription or a frieze "Information" intended for placing information provided by carriers,
 - b) information display cabinets can be used on platforms and buildings as free-standing, permanently fixed to the substrate and for suspension, located e.g. on access paths to platforms and on walls in railway station buildings,
 - c) information on the timetable (train arrivals/departures) in the form of posters should be placed in display cabinets located along the track axis behind the line of clock boards or in the railway station building in accordance with the development of the traveller service space,
 - d) it is recommended to equip the display cabinets located on the platform with a frieze with the name of the station/stop, which may replace a separate board with the name of the station/stop. It is not allowed to use a display cabinet with a frieze of the name of the station/stop and a board with the name of the station/stop in the direct vicinity,
 - e) the recommended minimum distance between the lower edge of the display cabinet and the platform or floor surface is 780 mm, and the minimum exposure surface height is 840 mm, display cabinets with timetables and carrier information should be located at all entrances to the platform and in the basic use area of the platform every 100 m (display cabinets with timetables),
 - f) it is recommended to use double-sided display cabinets, and on one-side platforms it is recommended to use single-sided display cabinets,

- g) the size of the display cabinets must ensure that posters in the min. format of B1 can be placed inside,
 - h) it is recommended to use LED lighting and a metal background in the display cabinets to place information/posters with magnets.
- 3) Displays:
- a) dynamic information elements should visually interact with the facility architecture, as well as with other information elements of the railway station building or platform,
 - b) the arrangement of the displays must be designed in such a way that the passenger entering the railway station building and station/stop area, i.e. being in each zone intended for travellers, can obtain the necessary information about the train he/she intends to travel by,
 - c) display screens should guarantee legibility of the presented information under all ambient lighting conditions,
 - d) Displays should be installed at a height of at least 2400 mm above the surface of the floor, walkway, etc.,
 - e) SDIP displays should be installed on platforms at a spacing of approx. 50 m along the platform,
 - f) the requirements for the displays are specified in volumes VII.2 and VIII.1.

4.1.2 Public address system elements: loudspeakers and megaphones

- 1) In the area of the railway station building and railway station/stop facilities, the installation of megaphone elements of the broadcasting network should be planned in order to provide information related to the train traffic and safety and protection of persons staying in the area of the railway station building infrastructure.
- 2) The broadcasting system should have a range within the area of platforms, access paths to platforms (all communication routes leading to/from platforms, excluding open footbridges) and railway station building.
- 3) The arrangement (height, angle/direction), their number and sound level of the loudspeakers of the broadcasting network must ensure a good understandability of the delivered announcements in the entire basic use area.
- 4) When designing the location of loudspeakers, it is necessary to take into account the facility architecture, aesthetics and colour scheme of the interior and façade, as well as the land development nature so as to make them visually harmonise with the facility architecture.
- 5) As standard, the elements of the public address system (loudspeakers) should be installed on the components of buildings and structures located at the station/stop, i.e.:
 - a) on the walls and ceilings of the railway station building halls and railway subways,
 - b) on structural elements of the platform halls and platform umbrella roofs,
 - c) on lighting poles and other supporting structures (excluding supporting construction of traction contact line).
- 6) Loudspeakers and megaphones should be installed on the existing infrastructure elements, individually or in sets, at a height limiting access for unauthorised persons, i.e. above 2400 mm from the floor or pavement surface, etc.
- 7) The requirements for voice information are specified in volumes VII.2 and VIII.1.

4.1.3 Tylographic information elements (touch maps)

- 1) A facility typhlographic plan, the so-called touch map, should be placed at the entrances to the area of the railway station building and railway station/stop facilities enabling blind persons or visually impaired persons to orient (with respect to the reader) on the railway infrastructure area.
- 2) The touch map should contain:

- a) important elements of the railway station building space and passage routes, i.e. presentation of the main traveller service spaces, in accordance with the functional and spatial diagram of the railway station building and railway station/stop (including horizontal and vertical communication routes);
 - b) routing of the touch routes and convex markings of the touch paths;
 - c) descriptions in Braille;
 - d) legend with a description of symbols and colours used (including high chromatic contrast with the background);
 - e) marking of the reader's location.
- 3) The colour scheme and texture applied on the maps must specify and differentiate the open and closed spaces of the facility. This plan is intended to provide visually impaired persons with an idea of the entire facility, a number of platforms, location of ticket offices, waiting rooms, toilets and passenger information places, etc.
 - 4) It is recommended to install touch maps on a special stand with a touch map inclination from 45 to 85 degrees in relation to the horizontal plane.
 - 5) Maps can be located both inside and outside the facility.
 - 6) The requirements concerning the typhlographic information are specified in volume VIII.1.

4.1.4 Clocks

- 1) Clocks should be used on all railway station buildings, in such number and face size as to enable easy reading of time from any place accessible for public use by travellers. These are functional zones of the railway station building, communication routes (subways, footbridges) and platforms.
- 2) Clocks can be installed as free-hanging elements on existing infrastructure elements (e.g. lighting poles, supporting structures, walls) or built into the display and information kiosk enclosures.
- 3) All clocks must ensure reading of the current time indications (local time) with the implication of hours, minutes and seconds. All clocks at the station/stop should be synchronised.
- 4) The layout and size of digits as well as the shape and dimension of clock hands should ensure the legibility from a distance of at least 40 m in the railway station building facility and communication routes and legibility from a distance of at least 50 m on platforms.
- 5) For independent clocks installed on platforms and in rooms for travellers' use (e.g. waiting room), a diameter of not less than 600 mm should be assumed. Within the communication routes, it is allowed to reduce this dimension to 400 mm.
- 6) It is required to illuminate the clock face to ensure legibility of indications after dusk and under artificial lighting conditions.
- 7) Analogue clocks of displays should be round with a diameter of at least 300 mm. It is allowed to abandon the clock in case of:
 - a) displays located in the immediate vicinity of the station clock;
 - b) displays placed next to each other if there is a clock on one of them.
- 8) A diameter of 200 mm is assumed for a clock built into the information kiosk.

4.2 Benches

- 1) The benches in the public space of the railway station/stop should be located in the vicinity of communication routes outside the unobstructed route in a manner not limiting the capacity. The method of their arrangement in the railway station building facilities and on platforms should enable their identification by a person using a white cane.
- 2) The benches should be painted in colours contrasting with the background on which they are visible and have rounded edges. They should not have sharp elements that may expose users to injuries or damage to baggage or clothing.

- 3) The benches should be permanently fixed to the ground in a manner invisible from the user's level, preventing their removal by unauthorised persons.
- 4) The correct use of the bench requires free space of at least 40 cm (optimally ≥ 80 cm) from the bench front, so that the legs of persons using them do not disturb the persons using communication routes.
- 5) The access to the bench should take into account a free space for parking the wheelchair. The parking space intended for a person on a wheelchair should have a depth of at least 140 cm (recommended 180 cm) and a width of at least 90 cm so that the person on a wheelchair can park the wheelchair next to the bench without disturbing other users' of the space.
- 6) The benches should have an ergonomic shape, backs and armrests to facilitate sitting down and standing up. These elements should be placed on both sides of the bench and one armrest should be placed every 3 seats.
- 7) The width of the seat should be approx. 50 cm. The seat should be located at a height of 42 – 45 cm from the ground. The armrests should be located 15 – 20 cm from the upper surface of the seat. The angle between the back and the seat should be approx. 100 degrees.
- 8) Wood is the recommended material for use on the bench seat and back; it should be properly hard and resistant to conditions resulting from normal use. In heated closed rooms (waiting rooms, platform halls) it is allowed to provide steel or aluminium bench seats and backs.

4.3 Waste baskets

- 1) The location and placement of the waste baskets in the public space of the railway station/stop and railway station building facilities should be dictated by care and maintaining cleanliness and order. When designing, care should be taken to properly locate waste bins, as access to bins affects human behaviour.
- 2) When designing the basket locations, the distances must be taken into account so that an excessive distance does not provoke the throwing of the waste directly onto the ground/floor.
- 3) Baskets should be properly designed in terms of their easy and intuitive use, as well as cleaning and disinfection. The materials used for their production should be resistant to various atmospheric conditions and should have vandal-resistant properties.
- 4) Waste baskets being free-standing elements must be painted in colours contrasting with the background on which they are visible and must have rounded edges. They should be located in places where they do not disturb the blind or visually impaired persons and in a manner enabling their identification by the person using the cane.
- 5) At stations/stops characterised by high traveller traffic flows, transparent basket, meeting the safety requirements, i.e. enabling easy inspection of the contents and easy removal, should be used.
- 6) At other stations/stops, the recommended materials are: aluminium or steel with anti-corrosive properties and concrete. Wood may be used in locations with an increased service standard of travellers or which are subject to conservator protection.
- 7) It is allowed to use both bins for mixed waste (unsegregated waste) and bins that would allow for separate collection. The decision on the type of installed baskets should be made depending on the municipal waste management, resulting from local conditions and signed agreements.
- 8) The basket surface should be uniform and not porous. Openwork material may be used provided it is easy to maintain cleanliness, e.g. perforated sheet.
- 9) Recommended minimum basket capacity is 50 litres.
- 10) The bags should be placed in the enclosure and should not extend beyond the external surface. The baskets should enable easy replacement of bags and be protected against opening by unauthorised persons.
- 11) Free-standing baskets should adhere with the entire base surface to the pavement and be attached to it in a manner that is invisible from the outside.

- 12) The baskets should not be mounted to the structures of the umbrella roofs with seats.
- 13) It is recommended to place baskets on platforms near the benches and at the lighting poles.
- 14) The opening should prevent large objects from being placed in the basket. It is recommended to locate the opening so that atmospheric waste does not enter the basket.
- 15) The baskets should not have ash trays – this rule does not apply to baskets that are to be placed outside the area covered by the smoking prohibition.
- 16) In accordance with the recommendations of the Antiterrorist Operations Bureau of the National Police Headquarters, the waste baskets should meet the following requirements:
 - a) internal baskets:
 - made of transparent plastic;
 - transparent, with visible contents (transparent bags);
 - relocation possibility and easy access for a pyrotechnic robot.
 - b) external baskets:
 - it is recommended not to use concrete bins, bins encased in concrete, etc.; it is allowed to use material other than plastic;
 - transparent, with visible contents (transparent bags);
 - it is allowed to fix the basket permanently, provided that it is possible for the pyrotechnic robot to extract the contents of the basket (bag or inner container);
 - easy access for a pyrotechnic robot in a horizontal plane (front or side).

4.4 Handrails for resting while standing

- 1) Handrails for resting while standing are recommended on long communication pedestrian routes and platforms. The backs and seats should be installed at approx. 50 m intervals.
- 2) The handrail should be stiffened, e.g. by fixing it to the umbrella roof structure and made of durable material, e.g. steel.
- 3) The handrail seat should be made of wood.
- 4) The surface of the handrail should be inclined at an angle of approx. 45 degrees relative to the ground, and the lower edge of the support should start at 70 to 80 cm above the floor level. The width of the handrail should be at least 140 cm.
- 5) Solutions with handles to facilitate standing up are recommended.

4.5 Luggage stands

- 1) The luggage stands should be located at stations/stops with high travellers' traffic volume, within the basic use zone, in the vicinity of seats permanently fixed to other elements.
- 2) If sector umbrella roofs are located at the station/stop, the stands should be located underneath them.
- 3) The stands should be made of durable materials (e.g. concrete, steel) resistant to atmospheric conditions and vandalism.

4.6 Bicycle racks

- 1) Racks within the railway station building facility should be planned in easily accessible, illuminated and monitored places so as not to hinder traffic in the area of the railway station/stop and not to narrow communication routes.
- 2) The racks should be permanently fixed to the ground and should have a structure resistant to atmospheric conditions and vandalism (hot dip galvanised or acid-resistant material).
- 3) The rack must be capable of supporting and securely fastening the bicycle (wheel and frame) by the user using his/her own fastener.

- 4) It is recommended to use “U-shaped” racks enabling convenient parking of at least 2 bicycles regardless of frame size, tyre width or handlebar shape.
- 5) Standard dimensions of the rack should be assumed as: length 70 – 100 cm, height 60 – 80 cm, the diameter of a metal hollow section with a round cross-section of 5 – 9 cm to ensure the possibility of using an U-lock (padlock); the pipe wall thickness must not be less than 3.2 mm.
- 6) Minimum clearance between the racks should be at least 900 mm.
- 7) It is recommended to mark the bicycle racks with waterproof stickers with information on the safe methods of fastening the bicycle.

4.7 Small retail booths, including automatic dispensers

- 1) Locations for small retail booths (e.g. sales of: press, beverages, confectionery, flowers, etc.) and automatic dispensers should be provided in the area of the railway station/stop in public spaces so as not to limit the unobstructed route and main communication routes.
- 2) It is essential to strive for the elimination of the problem of queues perpendicular to the passages to the automatic dispensers by locating them in designated zones or in appropriate places (e.g. side setting). The selected solutions should match local conditions.
- 3) For free-standing equipment (ATMs, ticket machines, information units, vending machines, baggage storages, etc.) it is necessary to anticipate possible reinforcement of the floor slab and to consider fixing to the floor.
- 4) Small retail booths and automatic dispensers should be provided with the connection to the necessary systems and the connections adapted to their type and requirements.

4.8 Separated areas with disinfectants for travellers

- 1) Places with disinfectants should be located in the area of the railway station/stop, preferably at the entrances to the railway station buildings and on platforms.
- 2) It is recommended to use automatic dispensers that do not require physical contact with the device.
- 3) The station/stop dispensers should enable as many applications as possible and make-up with any type of disinfectant.
- 4) Solutions consisting of wall-mounted and free-standing automatic units, both with mains or battery power supply, are allowed. The choice of specific solutions should be determined by local conditions and demand.

4.9 Video surveillance elements

- 1) Video surveillance systems should be provided in the area of the railway station building and railway station/stop facilities to ensure safety and public order as well as protection of persons and property.
- 2) It is absolutely necessary to monitor facilities, rooms and equipment intended for use and service by travellers, in particular:
 - a) entrances/exits to the building and platforms;
 - b) main hall;
 - c) ticket offices, information points and ticket machines;
 - d) waiting rooms;
 - e) communication routes;
 - f) platforms;
 - g) surroundings of the railway station building: access roads and access paths, car parks.

- 3) Cameras recording events inside and outside the building should ensure the required resolution enabling the identification of persons.
- 4) Places covered by video surveillance should be marked with appropriate information plates.
- 5) The elements of the surveillance system should be located at a height above 2400 mm.

4.10 Ornamental elements

- 1) For safety reasons (potential possibility of hiding hazardous materials and risk of additional hazard as a result of explosion), it is necessary to aim at limiting the use of ornamental elements such as planters and pots with the plants in the area of the railway station/stop and railway station buildings.
- 2) It is allowed to use ornamental elements in cases when the vessel structure makes it impossible to hide the hazardous material, i.e. it constitutes a solid whole or its elements are permanently bonded and do not have spaces enabling to hide other objects.
- 3) All installed pots must be permanently fixed to the ground or have a weight preventing their displacement or lifting; the colour of the vessels should not blend with the background.
- 4) It is necessary to select plants that are easy to care for, effective, not propagating with wind, adapted to the climatic conditions in Poland, evergreen or a mixture of plants taking into account seasonal changes.
- 5) Parts of plants (flowers and leaves) should not be poisonous or have sharp spines.

4.11 Structural and lighting poles

- 1) Structural and lighting poles should not constitute obstacles to traffic in zones accessible to travellers and should not limit the capacity of communication routes. They should also not hinder the visibility of other signs, cut the touch paths and interfere with the linear drainage elements.
- 2) Structural and lighting poles should be used for the installation of information boards and other elements of permanent marking, clocks and systems routing in their structures. Installation of these elements should not hinder access to the electrical interface of the pole.
- 3) The poles should meet the conditions for using colour contrast and no sharp edges; the finish should be resistant to graffiti or protected with an antigrffiti coating.
- 4) External poles and supporting structures should be provided with protection against birds.

5 Reference documents

The following reference documents were used to prepare Volume VIII.4:

5.1 EU legal documents

- directives:

- [1] Dyrektywa Parlamentu Europejskiego i Rady (UE) 2016/797 z dnia 11 maja 2016 r. w sprawie interoperacyjności systemu kolei w Unii Europejskiej (Dz.U.UE L 138/44 z dnia 26.05.2016)
- [2] Dyrektywa Parlamentu Europejskiego i Rady (UE) 2016/798 z dnia 11 maja 2016 r. w sprawie bezpieczeństwa kolei (Dz.U.UE L 138/102 z dnia 26.5.2016)

- regulations:

- [3] Rozporządzenie Komisji (UE) NR 1300/2014 z dnia 18 listopada 2014 r. w sprawie technicznych specyfikacji interoperacyjności odnoszących się do dostępności systemu kolei Unii dla osób niepełnosprawnych i o ograniczonej możliwości poruszania się
- [4] Rozporządzenie Parlamentu Europejskiego i Rady (UE) NR 305/2011 z dnia 9 marca 2011 r. ustanawiające zharmonizowane warunki wprowadzania do obrotu wyrobów budowlanych i uchylające dyrektywę Rady 89/106/EWG (Dz.U.UE L 88/5 z dnia 4.4.2011)

5.2 Legal documents of the Republic of Poland

- [5] Ustawa z dnia 28 marca 2003 r. o transporcie kolejowym (Dz.U. 2003 nr 86 poz. 789)
- [6] Ustawa z dnia 7 lipca 1994 r. Prawo budowlane (Dz. U. 2013 poz. 1409 z późn. zm.)
- [7] Rozporządzenie Ministra Transportu i Gospodarki Morskiej z dnia 10 września 1998 r. w sprawie warunków technicznych, jakim powinny odpowiadać budowle kolejowe i ich usytuowanie
- [8] Rozporządzenie Ministra Infrastruktury z dnia 12 kwietnia 2002 r. w sprawie warunków technicznych, jakim powinny odpowiadać budynki i ich usytuowanie (Dz. U. 2002, Nr 75, poz. 690 z późn. zm.)
- [9] Rozporządzenie Ministra Rozwoju z dnia 16 września 2020 r. zmieniające rozporządzenie w sprawie warunków technicznych, jakim powinny odpowiadać budynki i ich usytuowanie (Dz.U. 2020 poz. 1608)

5.3 Normative documents

- [10] PN-EN 527-2:2017 Meble biurowe - Stoły robocze - Część 2: Wymagania bezpieczeństwa, wytrzymałości i trwałości
- [11] IEC 60208:2011 Puste obudowy rozdzielnic i sterownic niskonapięciowych. Wymagania ogólne
- [12] PN-EN 50102:2001 Stopnie ochrony przed zewnętrznymi uderzeniami mechanicznymi zapewnianej przez obudowy urządzeń elektrycznych (Kod IK)
- [13] PN-ISO 3864-1 Symbole graficzne. Barwy bezpieczeństwa i znaki bezpieczeństwa. Część 1: Zasady projektowania znaków
- [14] PN-EN ISO 7010 Symbole graficzne. Barwy bezpieczeństwa i znaki bezpieczeństwa - Zarejestrowane znaki bezpieczeństwa
- [15] Karta UIC 413 Działania usprawniające podróż koleją

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