

# Railway Engineering Guidelines (RATO) part 16 Routes and platforms





Railway Engineering Guidelines  
(RATO) part 16,  
Routes and platforms

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## Railway Engineering Guidelines (RATO) part 16, Routes and platforms

Part 16 of RATO, "Routes and platforms", has been approved by the Finnish Transport Agency.

The guideline is applicable to all contracts and maintenance work commissioned by the Finnish Transport Agency from its date of entry into force. The guideline is used in railway area design, construction and maintenance contracts commissioned by the Finnish Transport Agency after the document's entry into force. Use of the guideline in railway area design, construction and maintenance contracts commissioned prior to its entry into force must be agreed separately with the Finnish Transport Agency.

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## Preface

Part 16 of the Railway Engineering Guidelines (RATO), “Routes and platforms”, defines the requirements and instructions for the design and constructions of passenger and loading platforms and passenger access routes at railway station areas. The guideline takes account of accessibility in the design of routes and passenger information systems, and the function of the station area. The purpose of revising the guideline is to update the requirements and instructions concerning accessibility, in order to comply with the requirements of the Finnish Transport Safety Agency (Trafi) regulation on the accessibility of railway systems /1/, while acknowledging practical experiences gained in various projects and from stakeholders. The most significant changes are related to the updated regulations issued by the EU and Trafi, as well as experiences obtained in major projects concerning accessibility requirements and their practical application.

The guideline takes into consideration the EU Commission Regulation (EU) No 1300/2014 “On the technical specifications for interoperability relating to accessibility of the Union’s rail system for persons with disabilities and persons with reduced mobility.”, which entered force on 1 January 2015. /2/

The need for changes to the guideline was assessed in a preliminary survey and reported in the publication, Research reports of the Finnish Transport Agency 30/2016 /3/. The preliminary report included a questionnaire on the need for changes to the guideline for stakeholders, disability associations and operators involved in the design and construction of railway systems.

In connection with updating this guideline, comments have been requested from railway system designers and constructors, disability associations and accessibility experts. The guideline has been prepared in close cooperation with the Finnish Association of People with Physical Disabilities, the Finnish Federation of the Visually Impaired, and the Accessibility Expert of the City of Helsinki.

The update to the guideline was commissioned by Senior Officer Arja Aalto from the Finnish Transport Agency and prepared by Janica Solehmainen and Laura Järvinen from Sito Oy. The working group also included Tuomo Viitala from the Finnish Transport Agency and Riikka Kallio and Sirpa Laitinen from WSP Finland Oy.

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## 16 Routes and platforms

RATO 16 is a guideline issued by the Finnish Transport Agency that is applied in the design of passenger and freight traffic routes and platforms, procedures related to the construction and maintenance of station buildings, and in the quality requirements for passenger information systems in stations. The requirements and instructions specified in the guideline must be observed in maintenance and improvement work carried out on station buildings, routes and platforms, and in the design and construction of new station buildings, routes and platforms on the state-owned railway network. The guideline also determines the threshold values for maintenance procedures.

The essential requirements concerning the interoperability of railway systems within the scope of application of this part of the RATO guidelines have been taken into account as specified in Directive 2008/57/EC of the European parliament and of the council and its amending Directives 2009/131/EC, 2011/18/EC, 2013/9/EU, 2014/38/EU and 2014/106/EU /4/.

Passenger platform, route and station area constructions and improvements that are designed and implemented in accordance with this guideline comply with the requirements of the EU Commission Regulation (EU) No 1300/2014 on the technical specifications for interoperability relating to accessibility of the Union's rail system for persons with disabilities and persons with reduced mobility (hereinafter referred to as "PRM TSI") /2/. This guideline provides instructions on the demonstration of compliance with the requirements of the PRM TSI.

Passenger platform constructions and improvements that are designed and implemented in accordance with this guideline comply with the requirements of the EU Commission Regulation (EU) No 1299/2014 on the technical specifications for interoperability relating to the 'infrastructure' subsystem of the rail system in the European Union (hereinafter "INF TSI") /5/.

Unless otherwise stated, the instructions specified in this guideline are, in every case, requirements that apply to both new constructions and improvements and renewals of existing structures. Instructions that should be considered recommendations are always indicated separately.

Exceptions to the requirements of this guideline are granted by the Finnish Transport Agency, insofar as the essential requirements concerning the technical specifications for interoperability of the EU's rail system and national regulations and legislation are not derogated.

## 16.1 Definitions

### 16.1.1 Terms

**Clear height** refers to the maximum height that an unobstructed clear space can accommodate.

**Clear space** is a space free of obstacles.

**Clear width** refers to the maximum width that an unobstructed clear space can accommodate.

**Contrast** refers to the difference in luminance of two adjacent surfaces, such as text and background, usually expressed as a percentage (%).

The **danger area** is the area at the edge of the passenger platform in which the aerodynamic effects of passing trains may cause danger to people or loose objects. The danger area is defined as the area where passengers are not allowed to stand when trains are passing or arriving. The danger area is not included in the clear space.

A **halt** is a railway traffic operating point that includes a passenger platform and is used to direct railway traffic or provide customer service. Halts do not include a rail yard or a place for changing tracks.

**Improvement** refers to replacements implemented to existing structures or systems so as to improve their performance.

**INF TSI** refers to the technical specification for interoperability relating to the infrastructure subsystem of the rail system in the European Union rail network.

An **island platform** is a passenger platform that is situated between two tracks and which services trains on both sides of the platform.

**Low-traffic station** is a station with an average daily passenger flow of at most 1,000 passengers, including passengers boarding and alighting trains.

**New** construction refers to supplementing an existing system with a structure or system whose design and construction are not substantially dependent on the existing structures or systems.

**Notified body** refers to an independent assessment body appointed by a Member State of the European Union for the task of ensuring and assessing compliance with the requirements of EU Regulations.

An **obstacle-free route** is a link between two or more public areas dedicated to the transportation of passengers. It can be navigated by all persons with disabilities and reduced mobility. Obstacle-free routes support the independent mobility and use of rail traffic by persons with disabilities and reduced mobility and elderly persons.

**Person with disabilities and person with reduced mobility** refers to any person who has a permanent or temporary physical, mental, intellectual or sensory impairment which, in interaction with various obstacles, may hinder their full and effective use of transport or its related infrastructure on an equal basis with other passengers, or whose mobility when using transport is reduced due to age. These persons include the following:

- wheelchair users (persons who move with the help of a wheelchair due to illness or injury)
- other persons with reduced or limited mobility, including the following:
  - persons with limb impairments
  - persons with difficulties in movement
  - persons moving with children or strollers
  - elderly persons
  - pregnant women
- visually impaired persons
- blind persons
- hearing-impaired persons
- deaf persons
- persons with difficulties in communication or understanding written or spoken language, including persons without skills in the local language and persons with sensory, mental or cognitive learning difficulties
- persons with short stature and children

The impairments and restrictions may be long-term or temporary and visible, or invisible.

**PRM TSI** refers to the technical specifications for interoperability relating to accessibility of the EU's rail system for persons with disabilities and persons with reduced mobility.

A **ramp** is an inclined structure or movable device that fulfills stairs or lifts when changing levels. Ramps are not designed and defined as pedestrian or bicycle routes.

**RATO** refers to the Railway Engineering Guidelines issued by the Finnish Transport Agency.

**Renewal** refers to the repair, i.e. the replacement of an existing structure or system in a way that does not improve the general level of performance of the track or the level of service of the station area.

A **side platform** refers to a passenger platform with a track on only one side, and which serves the passenger trains operating on that track.

A **stair-free route** is a part of an obstacle-free route that meets the needs of persons with reduced mobility. Stair-free route may include ramps or lifts, provided that these comply with the requirements on obstacle-free routes and accessibility.

**Station area** refers to a stopping point for passenger traffic trains and its accompanying services, passenger access routes and connecting traffic areas. The station area consists of tracks, passenger platforms and access routes from the surrounding society, including obstacle-free routes, services, and the station building. The connecting traffic area typically consists of a drop-off point, taxi stand and bus stop, as well as parking spaces for vehicles and bicycles

The **station building** refers to a heated space with services for rail passengers, such as a waiting area, ticketing room, ticket vending machines, toilet facilities, passenger information, and commercial services. The station building may be a separate building or part of the functions of another building.

The **structure gauge** refers to the area alongside the track that must be left free of fixed structures or equipment.

**Tactile contrast** refers to the contrast between two adjacent surface materials that is detectable by touch.

**Traffic operating point** is an area restricted for traffic management or passenger and/or freight traffic, which the infrastructure manager has defined as a traffic operating point. A traffic operating point may consist of various sections.

**Trafi** refers to the Finnish Transport Safety Agency, which is responsible as for transport system regulatory and supervisory duties and issues necessary permits, approvals and other decisions regarding the transport sector.

#### **16.1.2 Symbols**

d	= nominal distance between the passenger platform and the vertical centre line of a straight track (mm)
d <sub>s</sub>	= nominal distance of the passenger platform on the inside of a curve (mm)
d <sub>u</sub>	= nominal distance of the passenger platform on the outside of a curve (mm)
H	= nominal platform height on a straight track (mm)
H <sub>s</sub>	= nominal platform height on the inside of a curve (mm)
H <sub>u</sub>	= nominal platform height on the outside of a curve (mm)
R	= track curve radius (m)
D	= track cant (mm)

## 16.2 Dimension criteria

### 16.2.1 People

When designing passenger routes, the width of a walking person is 0,85 m.

When designing passenger routes, the width of a person in a wheelchair is 0,90 m.

The turning circle of a wheelchair is 1,5 m in diameter.

A standing person requires 0,6 m<sup>2</sup> of space.

In the design for platforms, a standing person requires 1,0 m<sup>2</sup> of space.

A person with a stroller requires a space of 1,70 m in length and 0,9 m in width /6/.

### 16.2.2 Vehicles

#### 16.2.2.1 *Rescue routes*

In the case of rescue routes, the dimensions of a standard emergency vehicle are used as the design values for routes and passenger platforms.

A standard emergency vehicle has an outer turning radius of 12,5 m and requires a width of 3,5 m when travelling in a straight line. Its required clear height of 4,2 m. The length of the vehicle is at most 12 m, with a maximum total weight of 32,000 kg and axle weight of 9,000 kg. /6/

A standard medical vehicle has an outer turning radius of 7,0 m and requires a width of 3,0 m when travelling in a straight line. The required clear height is 3,0 m. The total weight of a medical vehicle is 4,000 kg. /7/

#### 16.2.2.2 *Service traffic*

The dimensions of a standard service vehicle are 2,5 m in height, 2,4 in width and 5,5 m in length. The outer radius of the turning circle is 6,0 m. The total weight of the vehicle is 3,500 kg.

#### 16.2.2.3 *Loading areas*

The design values used for freight traffic loading areas are the largest permissible dimensions for road-going vehicles. /8/

#### 16.2.2.4 *Two-deck car-carrier loading platforms*

Two-deck car-carrier loading platforms must be suitable for two-axle vehicles with a total weight of 3,500 kg.

The length of the standard vehicle in the design of two-deck platforms is 5,2 m, and the length of a vehicle combination is 13,0 m.

## 16.3 Routes

In this RATO guideline, routes refer to clearways in the station area which serve as connections to and from the passenger platforms and trains and between the station's various functions. In designing the routes, requirements and regulations on obstacle-free construction must be taken into account.

### 16.3.1 Obstacle-free route

#### 16.3.1.1 *General*

New station areas must contain at least one obstacle-free route that connects the following functions and services, where applicable:

- stopping points for connecting traffic in the station area (e.g. taxi, bus, tram, metro, ferry, bicycle)
- parking areas, including disabled parking spaces
- drop-off point
- accessible entrances and exits
- information areas
- ticket office
- ticket vending machines
- waiting areas
- visual and audible information systems
- toilet facilities
- platforms

New obstacle-free route must be designed as the shortest practical distance. The recommended maximum distance of an obstacle-free route connecting the closest passenger platform and station building or area is 50 metres.

New obstacle-free route must be the shortest practical distance between functions and services. The start and end points of an obstacle-free route shall be designed to take account of the overall functions of the station area. New obstacle-free route must cover the full length of a platform.

In the case of island platforms, at least one side of the platform must include an obstacle-free route. For island platform, obstacle-free routes are recommended for both sides of the platform.

The obstacle-free route must provide access to seats, ticket vending machines and tactile information within the platform shelters or waiting areas.

#### 16.3.1.2 *Obstacle-free route marking*

Obstacle-free routes must be designed and constructed according to the requirements of this guideline for new stations, station areas and platforms. In the case of renewal or improvement work on station areas, the aim is to construct an obstacle-free route, whose execution shall be determined by the Finnish Transport Agency on a case-by-case basis. Obstacle-free routes constructed for renewed or upgraded station areas must comply with the requirements of this guideline.

Obstacle-free routes within the station area must be identified by visual and tactile information placed in the centre of the free width of the route.

Obstacle-free routes must be identifiable with a white cane. The surface material of the route must withstand maintenance, weather conditions and vandalism.

Obstacle-free routes in indoor areas must be indicated with a tactile marking of at least 5 mm in height and 10 mm in width. The recommended width of a tactile marking is 25–35 mm. Tactile markings in indoor areas should be accompanied by contrasting marking of at least 200 mm in width. The recommended minimum contrast ratio is 30%. The contrasted element may not be elevated from the floor surface or interfere with the tactile marking of the obstacle-free route. Tactile markings must be glued and screwed to the floor to ensure that they are secured to the surface. Tactile markings that are secured using only glue are not recommended due to maintenance and vandalism. Tactile markings may be installed by embedding them into the floor, in which case the markings must be glued and screwed to the installed surface. Alternatively, they may be installed between the seams of floor tiles, in which case they must be secured without the use of glue or screws.

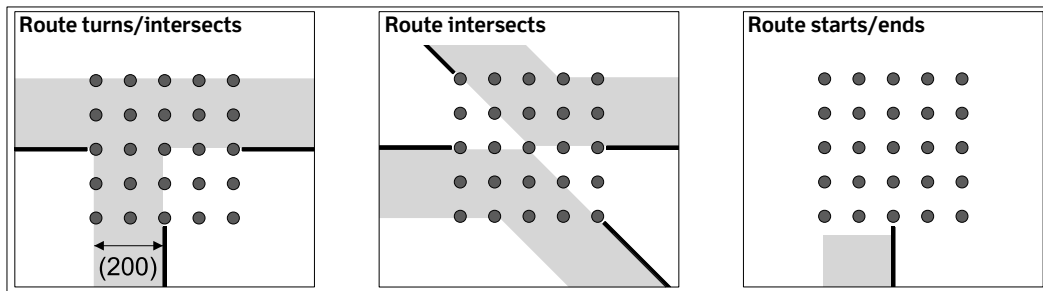
Obstacle-free routes in outdoor areas are recommended to be identified with a visual and tactile marking of 300 mm in width. Obstacle-free routes in outdoor areas must be identified with a visual and tactile marking of a minimum 200 mm in width. The recommended material is trimmed cobblestone blocks or a blocked granite tile. The contrast and width of the surface material of the obstacle-free route must be distinguishable from the tactile marking for the platform danger area. It is recommended that the surface material for the obstacle-free route marking be different from the tactile warning marking for the platform danger area.

In outdoor platform areas, obstacle-free routes may be marked using grated drainage channels where necessary. In such a case, the obstacle-free route must be continuous and may not be intersected by or run parallel to other drainage channels within the platform area. The drainage channels may not lead to obstacles. It is recommended that drainage channels be marked with a border of 200 mm in width that contrasts with the floor surface.

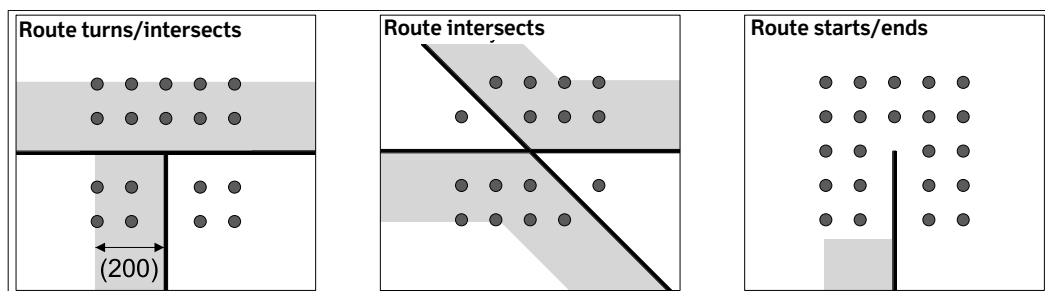
In indoor and outdoor areas, tactile attention markings of a distinguishable surface material must be placed at the branching, crossing, start and end points of obstacle-free routes and at turns of 90 degrees or sharper.

In indoor areas, it is recommended that a blister tile or similar marking of a size of 400x400 mm be used when the obstacle-free route is marked with a tactile marking of at least 10 mm in width, as indicated in figures 16.3:1 and 16.3:2.



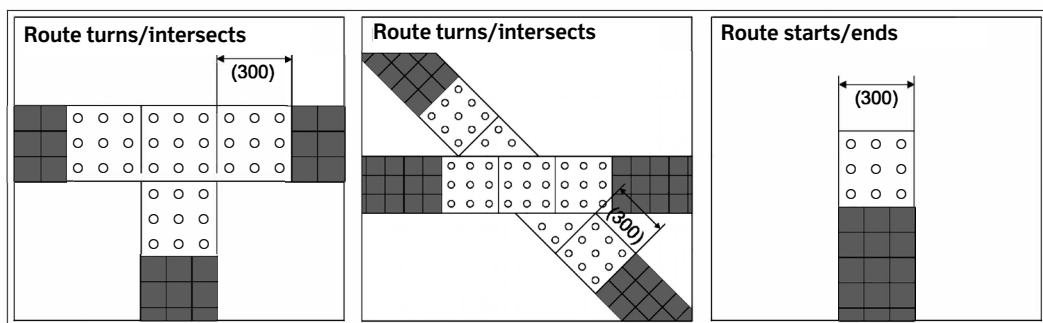


*Figure 16.3:1 Examples of turns, crossings, start and end points of an obstacle-free route in door areas, where the route is marked with a tactile marking of at least 10 mm in width and a contrasting border of at least 200 mm in width next to the tactile marking.*



*Figure 16.3:2 Examples of turns, crossings, start and end points of an obstacle-free route in door areas, where the route is marked with a tactile marking of at least 10 mm in width and a contrasting border of at least 200 mm in width next to the tactile marking.*

In outdoor areas, the recommended marking is a tactile blister tile or paving that begins and ends 300 mm before and after the ramification, intersection or turn, in cases where the obstacle-free route is implemented using paving or tiles as indicated in figure 16.3:3. The tactile attention marking must be at least as wide as the obstacle-free route, if the route is implemented using paving or tiles.



*Figure 16.3:3 Examples of turns, intersections, start and end points of obstacle-free routes implemented with paving or tiles in outdoor areas*

Drainage channels that intersect the obstacle-free route must be distinguished by their surface material at least 300 mm before and after the intersection.

The extensive use of grated surfaces should be avoided if this is a cause of difficulties in implementing and identifying obstacle-free routes. If an obstacle-free route passes over a grated surface, its markings must be distinguishable from the grated surface.

The identification and marking of obstacle-free routes may be supplemented with audible beacons, tactile signs, tactile maps and indoor positioning systems. The requirements for these measures are detailed in section 16.8 Guides, signs and information systems.

### **16.3.2 Structure**

#### **16.3.2.1 Routes**

Routes and obstacle-free routes must have a clear width of a minimum of 1,600 mm, with the exception of doorways. Routes that are partitioned into sections must also have a clear width of at least 1,600 mm.

Ramps that are constructed adjacent to new or improved stairs must have a minimum clear width of 1,600 mm. A single-lane ramp with a maximum length of 6 m may be constructed adjacent to the stairs. The clear width of a single-lane ramp must be at least 900 mm when measured between the handrails. Obstacle-free routes may not pass through single-lane ramps.

Routes within station areas that are serviced with floor maintenance machines have a minimum width of 2,300 mm and a minimum height of 2,800 mm.

Handrails are not recommended to be installed on pedestrian and bicycle routes. If a route is equipped with a handrail, the minimum width of the route must be extended by 250 mm per handrail or other railing /9/. The recommended width is at least 500 mm greater than the minimum route width.

The floor surfaces of routes must be anti-reflective and slip resistant, and they must stand out by contrast with their environment. The recommended minimum contrast ratio for the materials is 30%. The surface materials of routes must withstand maintenance and weather conditions.

Routes equipped with shelters have to design to be spacious. The recommended minimum height of underpasses and routes passing under buildings is 3,000 mm.

The clear height between the floor surface and the ceiling structures or signposts, displays, lighting or other equipment or overhangs must be at least 2,800 mm, with the exception of doors.

#### **16.3.2.2 Doors**

The clear height of doors of obstacle-free routes within the station area must be at least 2,100 mm. This requirement applies to all new and upgraded entrances and exits. The clear height must take account of the clearance required by the door closer.

This means that, in order to meet the requirement, the height of the door frame must typically be at least 2,200 mm.

The clear width of the doorframe must be at least 900 mm. The clear width is measured from the narrowest section of the door, taking into account the doorframe cover strips and the thickness of the turning door.

The use of thresholds should be avoided. The structures must be designed so as to stop water from entering, without the need for thresholds. The only acceptable reason for constructing a threshold is fire safety of the building. The maximum height of the threshold is 20 mm, and it must stand out by contrast with its environment.

The doors may be manual, semi-automatic or automatic. For manual and semi-automatic doors, it is recommended that the opening side should have at least 600 mm of clear space from the corner or other obstacle, in order to ensure accessibility for wheelchair users. For manual and semi-automatic doors, the opening side must have a minimum of 400 mm of clear space from the corner or other obstacle in order to ensure accessibility for wheelchair users.

Door operating devices, buttons and controls must be placed at a height of between 850–1,100 on the opening side.

In the case of manual door that is not sliding doors, both sides of the door must include vertical handles.

Semi-automatic and automatic doors must be equipped with devices that prevent the passenger from being trapped while passing through the door. It is recommended that door remain open for a minimum of 25 seconds.

Visually impaired persons must be warned of the clear space required by an automatic door swing with a tactile contrast.

Door operating buttons or other remote controls must stand out by contrast with their environment or background surface on which they are mounted. The recommended contrast ratio is 30%.

The force required to press the control button shall not exceed 10 N.

If both open and closed door control devices are fitted one above the other, the top device shall always be the open control.

The door control devices must be elevated from the surface and equipped with tactile markings indicating their function.

Revolving doors must be accompanied by at least one publicly accessible door that meets the above requirements.

### **16.3.2.3      *Obstacles on routes within the station area***

Obstacle-free routes must be free of any structural or other types of obstacles.

Transparent obstacles on or along the routes in the station area, consisting of glass doors or transparent walls, shall be clearly highlighted. The markings to highlight the obstacles must be placed at two heights, the lower of these being 1,000 mm and the higher between 1,400–1,600 mm. The markings must be permanently attached to the obstacle. /10/ The selection and placement of the markings must take account of maintenance, weather conditions and vandalism. Adhesive labels are not recommended due to their easy removal. The requirement for highlighted markings applies to all transparent obstacles within the station area, such as sales windows.

Markings are not required if passengers are protected from impacting with transparent obstacles by other means, such as by handrails, continuous benches or other structures.

Non-transparent obstacles on and along routes in the station area must stand out by contrast with their environment.

### **16.3.3 Park and ride and connecting traffic**

Where a station-specific parking area exists, sufficient parking spaces reserved for persons with disabilities and persons with reduced mobility eligible to utilise them, at the nearest practicable position to an accessible entrance. The accessible parking space shall have a minimum width of 3,600 mm and a minimum length of 5,000 mm /11/. The recommended minimum length of the accessible parking space is 6,500 mm. The number of accessible parking spaces must be at least one for every 50 parking spaces.

A parking space of a minimum length of 8.5 metres, for use by vehicles equipped with a tail lift, should be positioned along the obstacle-free route as close to the route to the passenger platforms or station entrance as possible.

Short-term parking spaces should be situated less than 50 metres from the station building or the nearest passenger platform. Short-term parking may be situated no more than 100 metres and long-term parking no more than 300 metres from the station building or nearest passenger platform.

It is recommended that fixed bicycle racks be installed at a distance of no more than 50 metres from the nearest passenger platform. It is recommended that at least half of bicycle rack spaces be sheltered. At least 50% of the rack spaces must be lockable to the bicycle frame.

The bicycle parking area must be distinguishable from the environment with a colour and tactile contrast zone.

Stopping points must be reserved for drop-off and pick-up traffic. Stopping points for taxis should be situated less than 50 metres from the station building or the nearest passenger platform.

Bus stops within the station area must be designed according to the project-specific design criteria and the regulations set by the Finnish Transport Agency and the local authority or municipality in question.

The station area must have obstacle-free access to the connecting traffic area.

### **16.3.4 Underground stations**

Underground stations are subject to the same design requirements as routes. Emergency exit routes on underground station platforms must have a clear width of a minimum of 1,200 mm. If the design passenger capacity of the platform exceeds 120 persons, the total minimum width of all emergency exits is calculated by adding 400 mm to the width of 1,200 mm for each 60 persons. /12/

Underground stations must be equipped with information systems and guidance concerning rail traffic, as detailed in section 16.9.

### **16.3.5 Maintenance routes**

#### **16.3.5.1      *Track crossings***

New island platforms may not be accessed by track crossings.

Track crossings may be constructed for renewed or upgraded platforms if the platform is not accessible by lift or a ramp as specified in section 16.4.2. The construction of track crossings should be avoided.

If its construction cannot be avoided, any track crossing must be situated at the end of the platform. Track crossings may not be constructed within the length of the platform.

New track crossings intended for use by passengers may only be constructed with the permission of the Finnish Transport Agency over tracks that are not passing through lines and have a speed limit of 80 km/h.

The track crossing must have a minimum width of 3,000 mm and comply with the requirements of Part 9 of the RATO guidelines on Level crossings /13/. When designing the crossing width, possible emergency and service traffic using the track crossing must be taken into account. Sections of the track crossing that do not pass over the track must be designed to ensure that emergency and service vehicles and maintenance equipment can safely enter and exit the platform.

The track crossing must be a deck panel without flange grooves. The recommended deck structure is a rubber panel without flange grooves.

The track crossing must be designed to correspond to the platform and paved, with the exception of the level crossing panel.

If a track crossing is a part of an obstacle-free route in a renewed or upgraded platform, the level crossing must be equipped with a warning system that is detectable by persons with disabilities and persons with reduced mobility. The warning system may consist of lighting, audible alerts or a barrier.

If an obstacle-free route includes a track crossing, this must be indicated by a attention marking of a minimum width of 1,000 mm. It is recommended that the attention marking be placed 1,000 mm from the edge of the level crossing panel. The level crossing panel must be equipped with a guiding strip to ensure that the obstacle-free route can be navigated continuously over the crossing.

A track crossing may serve as the designated route for emergency and service vehicles.

**16.3.5.2      *Service road***

The passenger platform must be accessible by a designated route for emergency and service vehicles, which may be a track crossing or a service road.

Service roads within the station area must be clearly distinguished from passenger platform with traffic signs. If necessary, service roads that are adjacent to passenger platforms must be gated to prevent passengers from accessing the service road.

Service roads shall be designed in accordance with Part 9 of the RATO Guidelines on Level crossings /13/. If the maximum traffic speed on tracks that the service road crosses is 120 km/h, the gate to the service road level crossing must be equipped with a lock openable using a master key.

If the maximum traffic speed on tracks that the service road crosses exceeds 120 km/h, the level crossing of the service road must be equipped with a safety system in accordance with Part 6 of the RATO Guidelines on Signalling systems /14/.

The track crossing of a service road may not restrict the use of traffic control and loading tracks.

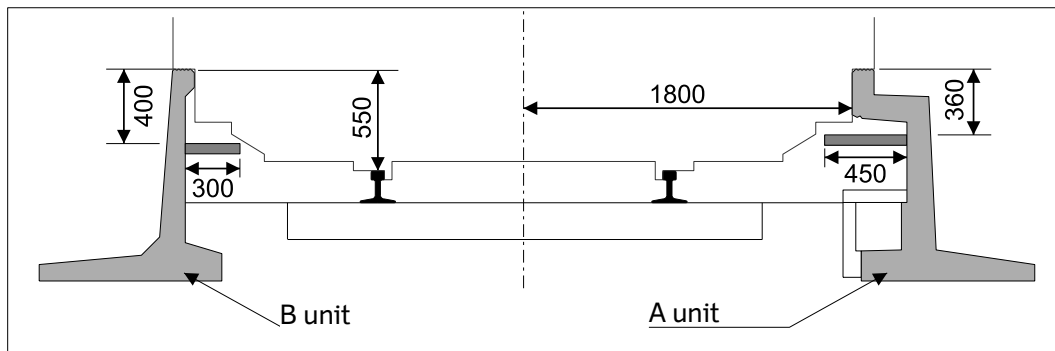
The level crossing used for service vehicle traffic must be located at the end of the platform.

**16.3.5.3      *Step in the platform element***

In some cases, the track must be directly accessible from the passenger platform. This need exists mainly in cases where the railway carriages or engine must be detached or attached in the platform area.

A metal step may be installed at a suitable location on the edge of a high platform, as indicated in figure 16.3:4. In the case of precast unit B, the depth of the step may be at most 300 mm to ensure that the step does not extend within the structure gauge. In the case of precast unit A, the recommended depth of the step is 350 mm and the maximum depth 450 mm. The step must be painted with a yellow safety colour. If the opposite side of the track contains a step and there is no fence or lockable gate between the gate and the platform, the step must be accompanied by a sufficiently large sign prohibiting track crossing in Finnish and Swedish.

Construction of such a step always requires a permit from the Finnish Transport Agency.

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*Figure 16.3:4 Steps in the precast platform*

### **16.3.6 Landscaping and the station area environment**

Vegetation within the station area should be selected for ease of maintenance. The plants may not cause disruptions to track equipment or cause unnecessary visual obstruction, at the time of their planting or in the future.

Plants should not be situated on access routes or visibility zones. Plants may not cause disruption to maintenance work.

The use of allergenic plants on station areas should be avoided.

Vegetation must be trimmed so as to prevent it from protruding over steps or hindering the use of handrails.

Coniferous trees are the recommended type of plants for track areas. The use of broad-leaved trees should be avoided. Planting must take account of the protected track area, which extends 30 metres from the track centre line, or, in the case of several tracks, from the centre line of the outermost track. The protected area should be kept clear of trees or other plants that may cause danger to rail traffic, for example by falling over the tracks.

## 16.4 Vertical circulation

Level changes within the station area may be implemented with stairs and ramps, or stairs and lifts. In addition, escalators may be used. Escalators and lifts may not be the only available routes but must be supplemented by stairs or a ramp. Of these, ramps are the recommended alternative means of access.

Ramps are suitable for underpasses that cross below the tracks. The ramp must include corresponding stairs to serve as an alternative means of access. If the implementation of the ramp increases the length of the obstacle-free route to the nearest passenger platform by more than 200 metres, the platform shall include a lift as part of the obstacle-free route.

Escalators are suitable for overpasses that cross over the tracks. Escalators may only be installed in sheltered and protected areas.

Lifts are suitable for both underpasses and overpasses.

In all cases, new access routes within the station area must be implemented in a manner that ensures at least one functional obstacle-free access route to each passenger platform. Persons with reduced mobility must be provided with a stair-free route.

Level changes shall be positioned in relation to passenger flow so as to ensure that the distances of routes to all services and areas within the station are as short as possible.

### 16.4.1 Stairs

#### 16.4.1.1 *Dimensions and placement of stairs*

The maximum ascent and depth of stairs in outdoor areas is calculated using the formula in figure 16.4:1.

$$2n + e \approx 660\text{mm} \quad (16.4:1)$$

$n$  = step ascent  
 $e$  = step depth

For stairs in sheltered or heated outdoor areas, the recommended maximum ascent is 160 mm and a recommended depth of 300-400 mm. For stairs in unsheltered areas, the recommended maximum ascent is 120 mm and the recommended minimum depth 400 mm.

The maximum ascent and depth of stairs in indoor areas is calculated using the formula in figure 16.4:2.

$$2n + e \approx 630\text{mm} \quad (16.4:2)$$

$n$  = step ascent  
 $e$  = step depth



For indoor stairs, the recommended maximum ascent shall be 160 mm and the recommended minimum depth 300 mm.

For stairs constructed in new and upgraded stations, the clear width between handrails shall be at least 1,600 mm.

The recommended minimum width of new stairs is 2,500 mm. In designing the width of stairs, the minimum total width of all exit routes in relation to the number of passengers must be taken into account /10/.

New stairs constructed perpendicular to the track must be placed at least 4 metres from the edge of the platform danger area on the side facing the platform.

#### **16.4.1.2      *Structure of the stairs***

All step surfaces must be slip resistant and anti-reflective.

A tactile warning area covering the entire width of the step must be placed before the upward and downward steps. The minimum depth of the warning area must be 600 mm, and it must be distinguishable from the floor or ground surface and other tactile markings of routes and pathways. If the stairs are the direct continuation of a route, the minimum depth of the warning area must be 1,200 mm.

At the bottom end of the stairs, the tactile warning area must begin immediately at the front edge of the lowermost step. At the top end of the stairs, the tactile warning area must begin immediately after the edge of the uppermost step.

The tactile warning area may be a slip resistant grated surface that can also be used as a drainage channel.

The front edge of the steps shall be equipped with a band that contrasts with the background, with a recommended contrast ratio of 30%. The contrast band is recommended to be implemented either as part of the structural solution of the step or by lining a milled groove with refractory mass. The minimum width of the contrast band is 30 mm.

Open staircases and transparent steps may not be installed in new stations.

The dimensions of stairs are specified in figure 16.4:1.

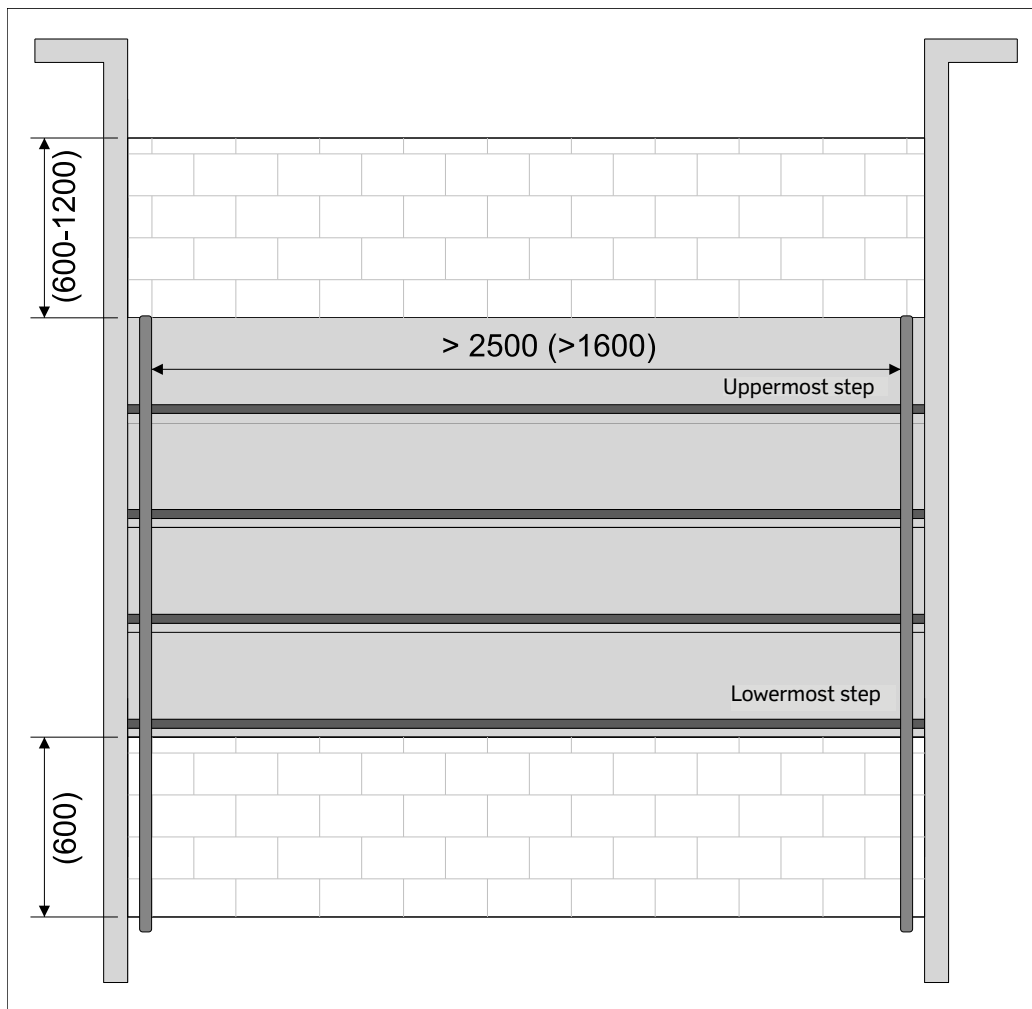


Figure 16.4:1 The figure presents the recommended minimum dimensions for stairs, with the mandatory minimum dimensions included in parenthesis.

### 16.4.1.3 Handrails

Stairs shall be equipped on both sides with handrails running at two heights.

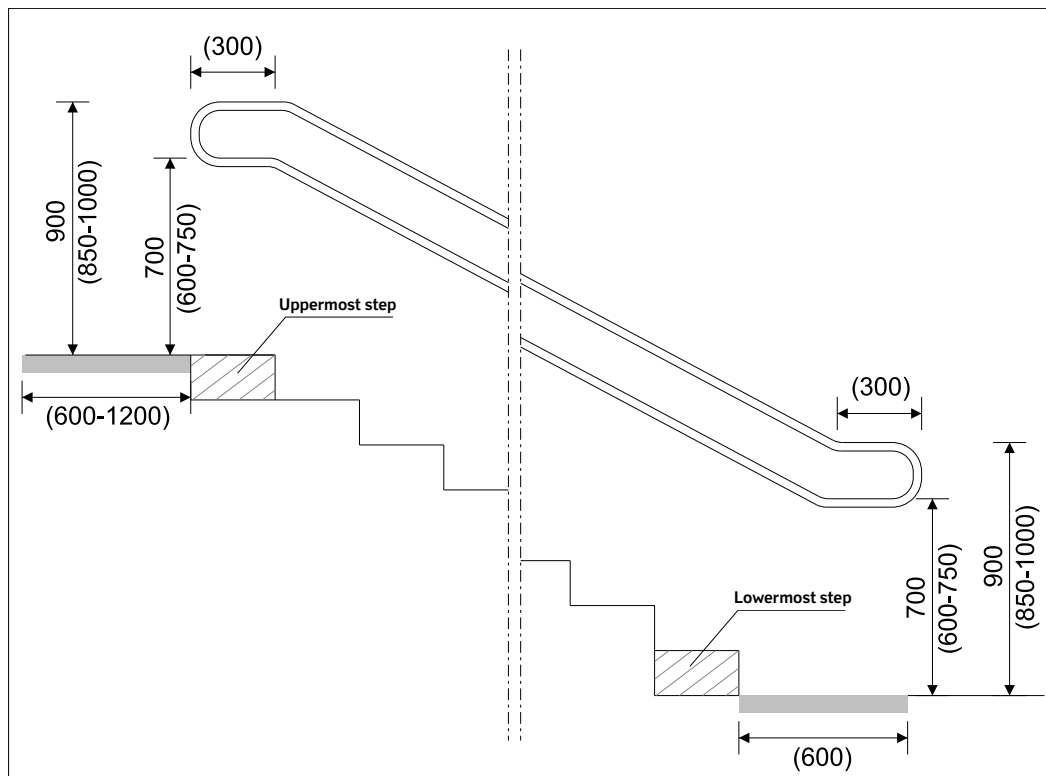
The recommended heights for the handrails are 900 and 700 mm.

The upper handrail must be placed at a height of 850–1,000 mm from the floor surface, and the lower handrail at a height of 600–750 mm from the floor surface.

The height of the handrails is measured from the edge of the step to the upper surface of the handrail.

It is recommended that handrails are installed on stairs so as to allow a clear space of 2,500 mm between the handrails.

The handrails must be continuous. At the top end of stairs, the handrails must continue at least 300 mm after the front edge of the uppermost step. At the lower end of stairs, the handrails must continue at least 300 mm after the point where the handrails are at the designed height from the floor surface. After the end of the stairs, the handrails must continue horizontally, as indicated in figure 16.4:2. It is recommended that the continuations of the upper and lower handrails are connected to one another.



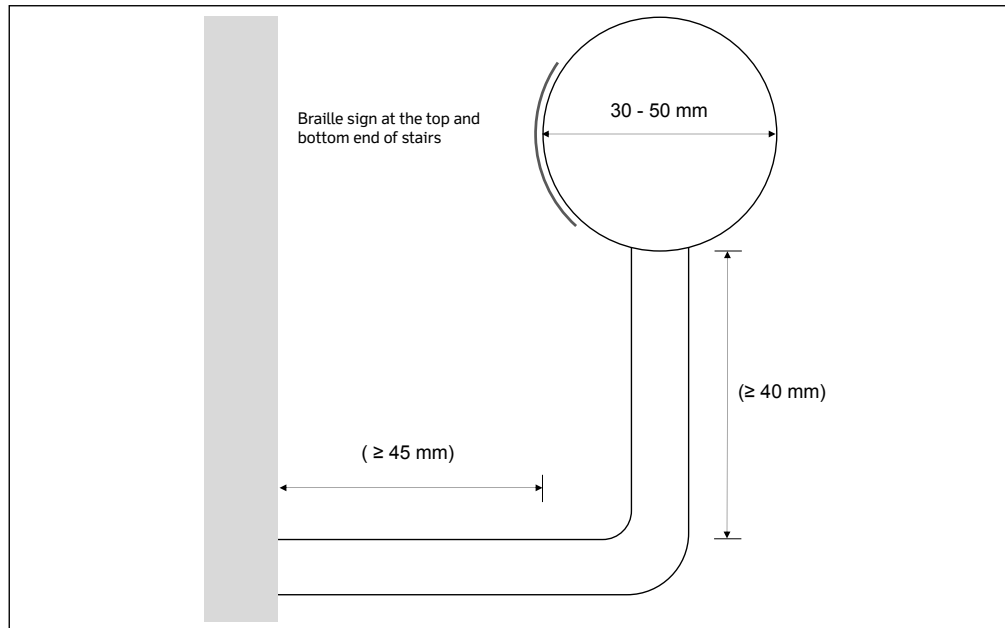
*Figure 16.4:2 Height of the handrails and their continuation after the end of stairs. Recommended minimum dimensions, with mandatory minimum dimensions in parenthesis.*

Handrails and other structural parts other than their mountings shall have a minimum clear space of 40 mm. The handrail fasteners shall not prevent a continuous grip on the handrail. Fasteners are recommended to be placed on the underside of the handrail, as indicated in figure 16:4:3.

Handrails must be round with a cross-section of a diameter of 30–50 mm. Handrails must stand out by contrast with their surrounding walls. Designs for the diameter of handrails must take into account of the space required for Braille signs on the handrail surface. Braille signs must be installed on the lower and upper end of handrails on both sides of the stairs, on at least the upper handrail. It is recommended that Braille signs are installed on handrails at both heights. The Braille sign must be installed on the back surface of the handrail in order to be tactile when the handrail is held as indicated in figure 16.4:3. It is recommended that the Braille sign is installed curved on the back surface of the handrail. Vandalism must be taken into account when installing the Braille signs.

The minimum distance between the handrail and wall is 45 mm.

The handrail must be smooth and, if constructed of wood, may not result in splinters.



*Figure 16.4:3 Dimensions of the handrail and its fasteners. Recommended minimum dimensions, with mandatory minimum dimensions in parenthesis.*

#### **16.4.1.4 Transit ramp**

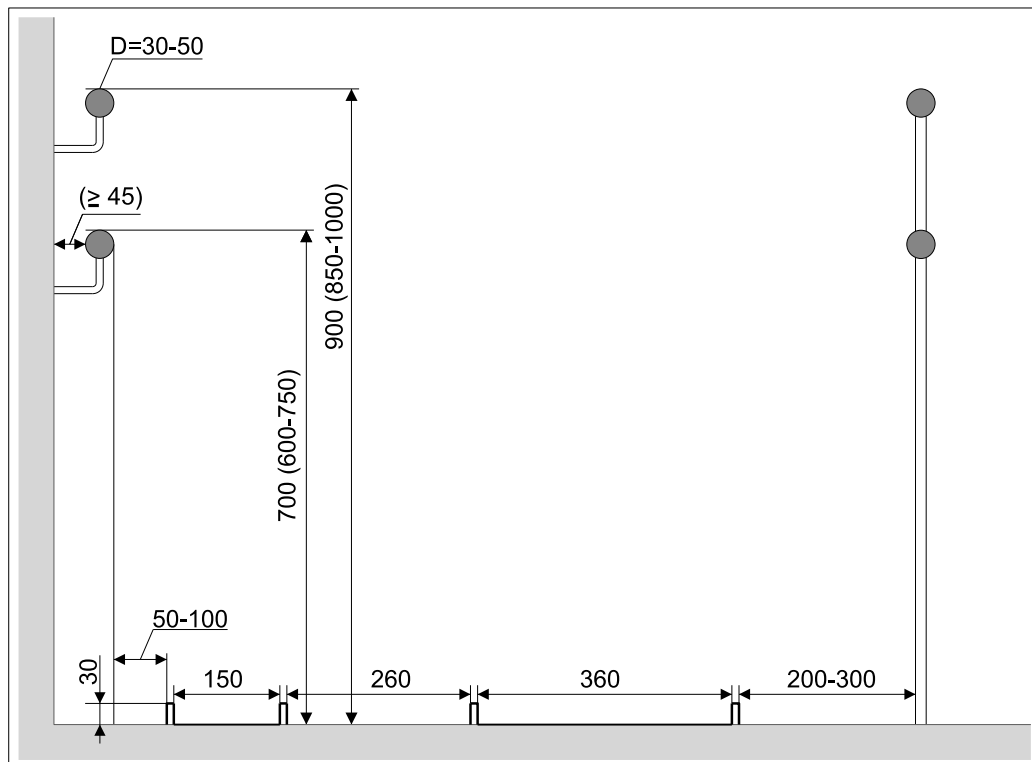
The construction of a new transit ramp is not recommended for stairs in new, renewed or upgraded stations. A transit ramp does not meet the requirements for accessibility or obstacle-free routes.

The construction of a transit ramp is permitted for the stairs of new stations if the station's level changes meet the requirements of section 16.4.

The dimensions of transit ramp for the stairs of new, renewed or upgraded stations must be in accordance with figure 16.4:4.

New transit ramp must be separated from the clear width of the stairs with a handrail. Both sides of a transit ramp must be equipped with handrails that are designed and installed in accordance with section 16.4.1.3.

The surface of the transit ramp must be slip resistant. The recommended surface is a grooved stainless steel or rubber plate. The use of waterproof plywood as the surface material for transit ramps is prohibited.



*Figure 16.4:4 Dimensions of transit ramps and handrails installed in stairs.  
Recommended minimum dimensions, with mandatory minimum dimensions in parenthesis.*

Current transit ramps are recommended for removal from stations in connection with upgrading work. The need of current transit ramps shall be assessed before their removal.

If the dimensions of the current transit ramps of a station undergoing upgrading work do not meet the requirements of this guideline in accordance with figure 16.4:4, the ramps must be removed in connection with upgrading work carried out for the stairs connecting the platform, or if the station has an existing lift or ramp that serves as a secondary level change to the platforms.

If the dimensions of the current transit ramps of an upgraded station comply with the requirements of this guideline as indicated in figure 16.4:4, the ramp may be retained for use.

#### **16.4.1.5 Areas under steps**

Insofar as the clear height of areas under stairs is below 2,200 mm, the areas under of stairs must be protected to ensure that passengers cannot traverse the area under stairs to accidentally collide with structural supports and areas with lowered headroom. Access under the stairs must be restricted by using surface material for areas under stairs that stand out by contrasts with its background and is detectable with a white cane. The recommended minimum contrast ratio is 30%.

#### **16.4.1.6 Escalators**

Escalators shall comply with the standard SFS-EN 115-1 + A1 /15/. The maximum speed of escalators is 0.65 m/s, and their recommended maximum speed is 0.50 m/s.

**16.4.1.6 Escalators**

Escalators must comply with the standard SFS-EN 115-1 + A1 /15/. The maximum speed of escalators is 0.65 m/s, and their recommended maximum speed is 0.50 m/s. The top and bottom ends of escalators shall be equipped with tactile warning areas that extend the full width of the escalator. The minimum depth of the warning area is 600 mm, and it must be distinguishable from the floor or ground surface and other tactile markings of routes and pathways. If the escalator is the direct continuation of a route, the minimum depth of the warning area is 1,200 mm. The warning area must stand out by contrast with its surrounding surface material. The recommended minimum contrast ratio is 30%.

The tactile warning area may be a slip resistant grated surface that can also be used as a drainage channel.

**16.4.2 Ramps****16.4.2.1 Use of ramps**

Where lifts are not provided, ramps must be installed for persons with reduced mobility.

**16.4.2.2 Structure and geometry of ramps**

The recommended minimum width of new ramp is 2,500 mm.

Ramps installed for new and upgraded stations must have a clear width of at least 1,600 mm, measured between the handrails. If the ramp does not border a wall or is not at level with the surrounding terrain, the ramp shall be equipped with safety barriers of a minimum height of 50 mm to prevent wheelchairs from slipping over its edge.

The recommended gradient of ramps is 5% or lower. Ramps must have a maximum gradient of 8% and a maximum continuous run of 6,000 mm, after which the route must include an intermediate landing of at least 2,000 mm in length /9/. As a general principle, ramps with a gradient of at most 8% should be used in sheltered areas, and ramps with a gradient of at most 5% in unsheltered outdoor areas. Ramps situated in outdoor areas should be sheltered or heated. Winter maintenance must be performed on ramps situated in outdoor areas, to ensure that use of the ramps does not pose a danger of slipping.

Ramps along an obstacle-free route have a maximum gradient of 5%.

It is recommended that ramps do not have a lateral inclination. The maximum lateral inclination of ramps is 2%.

It is recommended that the top and bottom end of ramps be equipped with tactile warning areas that cover the entire width of the ramp. The minimum depth of the warning area is 600 mm, and it must stand out by contrast with the floor or ground surface. The warning area must be distinguishable from other tactile routes or paths. If the ramp is the direct continuation of a route, the minimum depth of the warning area is 1,200 mm.

The tactile warning area may be a slip resistant grated surface that can also be used as a drainage channel.

The surface material of ramps must be slip resistant and anti-reflective.

#### **16.4.2.3 Handrails**

Ramps with a gradient of more than 2.5% are recommended to be equipped with handrails. Ramps with a gradient of 5% or greater must be equipped with handrails.

Such ramps shall be equipped on both sides with handrails running at two heights.

The recommended heights for the handrails are 900 and 700 mm.

The upper handrail must be placed at a height of 850–1,000 mm from the floor surface, and the lower handrail at a height of 600–750 mm from the floor surface.

The handrails must be continuous. The handrails must continue horizontally at least 300 mm after the bottom and top ends of the ramp. As in the case of stairs, handrails must be turned to run horizontally after the ends of the ramp, as indicated in figure 16.4:2. It is recommended that the continuations of the upper and lower handrails be connected to one another.

Handrails installed to a ramp situated on a platform may not extend within the structure gauge.

Handrails and other structural parts other than their mountings must have a minimum clear space of 40 mm. The handrail fasteners must not prevent a continuous grip on the handrail. Fasteners are recommended to be placed on the underside of the handrail, as indicated in figure 16:4:3.

Handrails must be round with a cross-section of a diameter of 30–50 mm. Handrails must stand out by contrast with their surrounding walls. Designs for the diameter of handrails must take into account of the space required for Braille signs on the handrail surface. Braille signs must be installed on the lower and upper end of handrails on both sides of the ramp on at least the upper handrail. It is recommended that Braille signs are installed on handrails at both heights. The Braille signs must be installed on the back surface of the handrail in order to be tactile when the handrail is held as indicated in figure 16.4:3. Vandalism must be taken into account when installing the Braille signs.

The recommended minimum distance between the handrail and wall is 45 mm.

The handrail must be smooth and, if constructed of wood, may not result in splinters.

#### **16.4.3 Moving walkways**

The station area may be equipped with horizontal or inclined moving walkways for the transport of passengers.

The maximum speed of walkways is 0.75 m/s.

The maximum gradient of walkways is 12° (21.3 %).

Walkways may not be included as part of an obstacle-free route.

#### **16.4.4 Lifts**

Lifts must be installed to supplement stairs in cases where the level change between the platform and other routes is one storey or higher. Obstacle-free lifts must be installed for platforms that cannot be accessed by ramps that meet the accessibility requirements. Lifts must comply with the requirements presented in table 1 of the standard SFS-EN 81-70:2003 + A1:2004 /16/.

The lift cage must have a minimum width of 1,100 mm on the side containing the doorway and a minimum depth of 1,400 mm. If the doorways are on adjacent sides of the cage, the minimum cage dimensions are 1,400 mm x 1,400 mm. /11/

In order to facilitate the turning of a wheelchair inside the lift cage, the recommended width of the lift cage on the side containing a doorway is 1,340 mm and the recommended minimum depth 1,400 mm.

The minimum width of the lift door is 900 mm. Transparent lift doors shall be equipped with highlighted markings as described in section 16.3.2.3.

A turning space of a minimum of 1,500 x 1,500 mm in front of the lift must be reserved for wheelchairs.

Lifts along obstacle-free routes must have automatic doors.

Wheelchair users must be able to enter and exit lifts in both the forward or reverse direction. The recommended type of lift is a through-lift. In order to facilitate the exiting of the lift by reversing, the back wall of the lift must be of a highly reflective material or equipped with a mirror at a height of 300–900 mm. Alternatively, reversing may be facilitated by installing a mirror in the ceiling above the back wall of the lift at an angle of approx. 45°.

The lift control panel, and both emergency and door buttons must be installed to be easily detectable by visually impaired persons. The lowermost button must be installed at a height of at least 900 mm from the lift cage floor. The recommended height for the lowermost button is 900–1,000 mm from the lift cage floor. The uppermost button must be installed at a maximum height of 1,200 mm from the lift cage floor. The recommended height of the uppermost button is 1,100 mm from the lift cage floor. The recommended placement of the buttons is 400 mm from the corner of the lift cage.

The buttons shall clearly stand out by contrast with their background. The recommended minimum contrast ratio is 30%.

The emergency button must be clearly distinguishable from other buttons by their colour, size and shape.

It is recommended that a lift call button is installed outside the lift at a height of 900–1,100 mm.

Tactile or Braille signs must be installed in connection with the lift buttons.



In new and upgraded stations, audible beacons are recommended to be installed outside lifts. It is recommended that audible signage be included for lifts in platform areas.

The minimum illuminance inside the lift cage is 100 lx. The recommended illuminance is 300 lx.

New accessible lifts must be equipped with induction loops /17/.

It is recommended that induction loops be installed in front of the doors of new accessible lifts.

## 16.5 Passenger platforms

New and upgraded passenger platforms must have a nominal height of 550 mm. New and upgraded passenger platforms may not be designed with a lower nominal height. The nominal distance between the platform and track on straight tracks is 1,800 mm.

In the case of renewal of the platform, the nominal height may be either 265 mm (low platform) or 550 mm (high platform). Renewed low platforms should be altered to a nominal height of 550 mm, where possible.

Access routes to new and upgraded island platforms or between two side platforms must be constructed as slit-level routes.

A track crossing may be constructed for a renewed island platform or between side platforms, but this should be avoided. The track crossing must be designed as specified in section 16.3.5.1.

Pedestrian and bicycle routes may not be designed through passenger platforms.

### 16.5.1 Placement

#### 16.5.1.1 *Track geometry*

Passenger platforms should be situated adjacent to a straight section of the track. The placement of platforms must take account of access to the public street and road networks, the placement of stops and parking for connecting traffic, and maintenance aspects. The gradient of tracks adjacent to platforms must comply with the instructions and requirements of Part 7 of the RATO Guidelines on Railway traffic points /18/.

#### 16.5.1.2 *Passenger platforms on straight tracks*

The placement of passenger platforms must ensure that passengers have easy and safe access to and from trains.

The placement of passenger platforms may not impede the detectability and visibility of signal posts or their signals.

The top edge of a high passenger platform adjacent to a straight track must be positioned as indicated in table 16.5:1.

*Table 16.5:1. Placement of a high passenger platform and installation tolerances on a straight track*

	Normal value	Installation tolerance
Distance from track centre [mm]	D=1,800	+20
		-0
Height from top of the rail [mm]	H=550	+0
		-30

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The top edge of a low passenger platform adjacent to a straight track shall be positioned as indicated in table 16.5:2.

*Table 16.5:2. Placement of a low passenger platform and installation tolerances on a straight track*

	Normal value	Installation tolerance
Distance from track centre [mm]	D=1600	+20
		-0
Height from top of the rail [mm]	H=265	+10
		-20

### 16.5.1.3 Passenger platforms on curved tracks

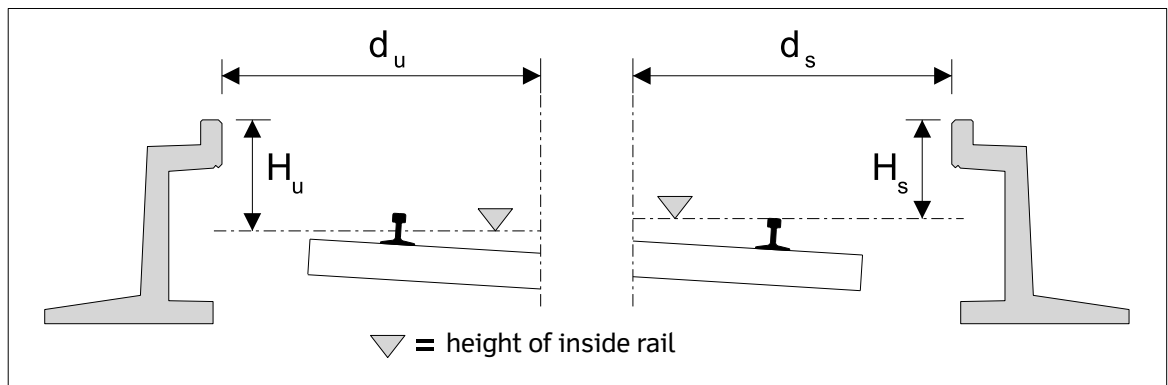
The minimum radius of a horizontal curve of track alongside the passenger platform is 600 m.

The maximum cant of the track alongside the passenger platform is 100 mm.

The recommended cant of tracks alongside passenger platforms is 0–60 mm.

The distance between the platform edge and the vertical centre line of the track is calculated according to the formulas 16.5.1 and 16.5.2.

Figure 16.5:1 indicates the calculation for determining the height of the passenger platform alongside a canted track.



*Figure 16.5:1 Determining passenger platform height on a canted track*

Height of the passenger platform edge from the horizontal level of the nearest rail, calculated according to formulas 16.5.3 and 16.5.4.

$$d_s = d + \frac{36000}{R} + H \cdot \frac{D}{1600} \quad (16.5:1)$$

$$d_u = d + \frac{36000}{R} - H \cdot \frac{D}{1600} \quad (16.5:2)$$

$$H_s = H - d \cdot \frac{D}{1600} + \frac{D}{2} \quad (16.5:3)$$

$$H_u = H + d \cdot \frac{D}{1600} + \frac{D}{2} \quad (16.5:4)$$

d	= nominal distance between the passenger platform and the vertical track centre of a straight track (mm)
d <sub>s</sub>	= nominal distance of the passenger platform on the inside of a curve (mm)
d <sub>u</sub>	= nominal distance of the passenger platform on the outside of a curve (mm)
H	= nominal platform height on a straight track (mm)
H <sub>s</sub>	= nominal platform height on the inside of a curve (mm)
H <sub>u</sub>	= nominal platform height on the outside of a curve (mm)
R	= track curve radius (m)
D	= track cant (mm)

On track transition curves, the width expands linearly to its maximum value in accordance with the requirements for structural gauge.

In curves without a transition curve, the procedure for structural gauges is complied with.

#### **16.5.1.4 Passenger platforms alongside switches**

The placement of passenger platforms alongside switches should be avoided. Placement alongside switches is possible only with the permission of the Finnish Transport Agency.

If a passenger platform must be placed alongside a switch, the requirements for structural gauges adjacent to switches presented in Part 2 of the RATO Guidelines on Track geometry must be followed /19/.

Switch equipment such as reverses, or terminal's monitoring contacts may not be placed below the passenger platform.

If a sufficient structure gauge requires that the edge of the passenger platform must be placed further from the track centre line than otherwise required by track geometry, the following procedures may be undertaken:

- The platform is changed to a low height platform over a short distance alongside the switch. Obstacle-free routes may not pass through low sections of the platform. In such a case, the low platform of a height of 265 mm may be positioned at a distance of 1,650–1,800 from the track centre line.
- The section alongside the switch is excluded from the platform area by a fence or other barrier. In practice, this means that passenger trains cannot stop at the switch, regardless of the safety device used.
- The aforementioned procedures require a permit from the Finnish Transport Agency.

#### **16.5.1.5 Environment**

Passenger platforms situated alongside existing tracks must have the best possible access to and from the platforms. The placement of passenger platforms must take account of the horizontal and vertical track geometry.

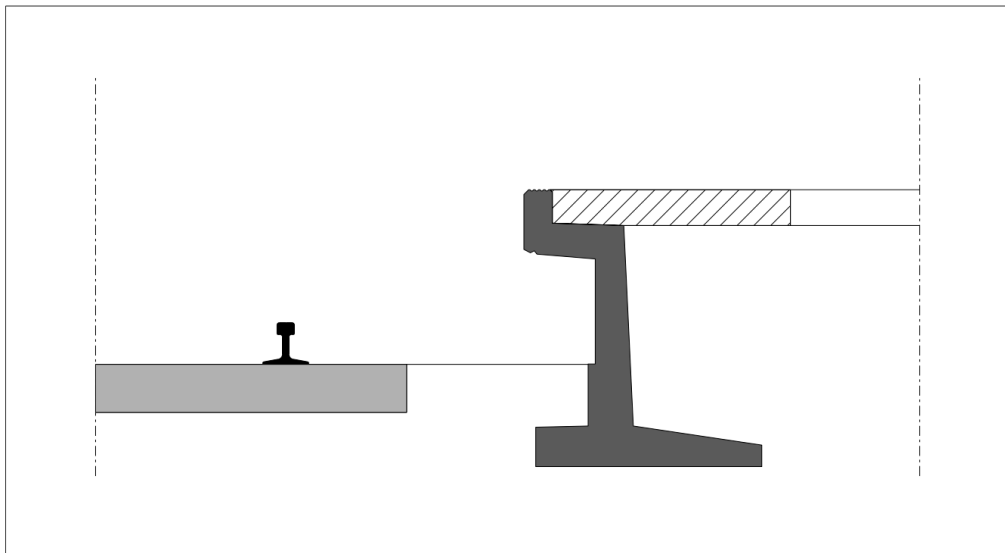
**RATO 16 Routes and platforms**

In terms of accessibility, the suitable location of a passenger platform is in the vicinity of underpasses and overpasses. All passenger platforms should be situated for quick and easy access by pedestrians and cyclists and from the stops and parking areas for connecting traffic. Stops and parking spaces for connecting traffic should be arranged to ensure that access to and from the trains is of a roughly equal distance.

**16.5.2 Structure****16.5.2.1 Edge structure**

The primary edge structure option for new or upgraded platform is a type A precast platform unit in accordance with the standard-project drawing /20/ in figure 16.5:2. Type A platform units are used for passenger platforms located alongside tracks with a target speed of more than 120 km/h.

Type A platform units are also used for passenger platforms that include a cable trough /21/. The cable trough cover must be concrete if the passing speed of trains exceeds 160 km/h. Otherwise, the cover may be pressure-treated wood. However, the use of concrete covers is always recommended.



*Figure 16.5:2 Type A platform unit*

Type B precast platform units, in accordance with the standard-project drawing /20/ in figure 16.5:3, may be used for platforms alongside tracks with a target speed of less than 120 km/h.

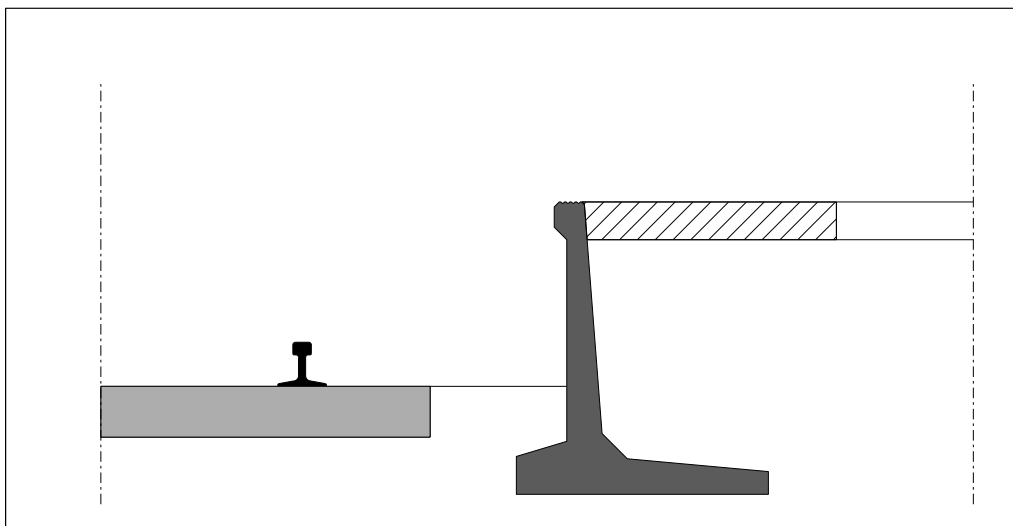


Figure 16.5:3 Type B platform unit

#### 16.5.2.2 Danger area

New, renewed and upgraded passenger platforms must include marked danger areas upon their commissioning.

The danger area of the passenger platform begins from the edge of the platform on the side of the track.

The minimum width of the danger area is determined according to the highest permitted track speed, as presented in table 16.5:3. In determining the track speed, it may not be presumed that all passing trains stop at the passenger platform.

The danger area is not included in other dimensions of the platform.

Table 16.5:3. Minimum width of danger area according to the maximum track speed.

Maximum track speed (km/h)	0–60	61–120	121–200	over 200
Minimum width of danger area (m)	0.5	1.0	1.5	2.0

#### 16.5.2.3 Surface materials

The surface material for passenger platforms may be concrete stones or tiles or a combination of these, natural stone, or asphalt. Asphalt may not be used as a surface material for indoor platforms. The use of large concrete tiles is not recommended.

All platform surface materials must be slip resistant and anti-reflective. The materials must withstand regular sanitation and maintenance and weather conditions. The surfaces must retain their slip resistance even when wet.

The surface material may not be a loose material such as gravel. The use of loose material is permitted during construction, provided that the surface of obstacle-free routes is of a solid material.

The danger area must stand out by contrast with the safe platform area where standing is permitted. The recommended minimum contrast ratio is 30%.

The surface material of the danger area on the side of the track must contrast with the unilluminated, dark-coloured gap between the train and platform. The recommended material is a light-coloured concrete tile or stone, natural stone or white-coloured asphalt. Asphalt is not permitted as a surface material for danger areas in platforms in underground stations.

The edge of the danger area on the side of the platform must be equipped with a visible and tactile warning sign that is detectable with a white stick.

The edge of the danger area on the side of the platform must include a visual warning sign. The warning sign must be a yellow warning band of at least 100 mm in width. The warning sign is included in the width of the danger area.

In outdoor platforms, the yellow colour must comply with the Finnish Transport Agency guideline on the quality requirements for road markings /22/. The recommended material is the marking paint used for road markings. The use of regular yellow paint is not recommended for outdoor platforms, due to its poor longevity and need for repainting.

In indoor platforms, the recommended surface material for danger areas is yellow paint, stones, or other marking attached to the floor surface, such as rubber coating or a tape marking. The design and installation of the floor markings must take account of maintenance and vandalism.

Requirements for the minimum width of tactile markings and indicators are indicated in table 16.5:4, in accordance with the minimum width of the danger area. Tactile markings and indicators must be placed between the edge material on the side of the track and the visual marking.

*Table 16.5:4 Minimum widths of tactile danger area markings*

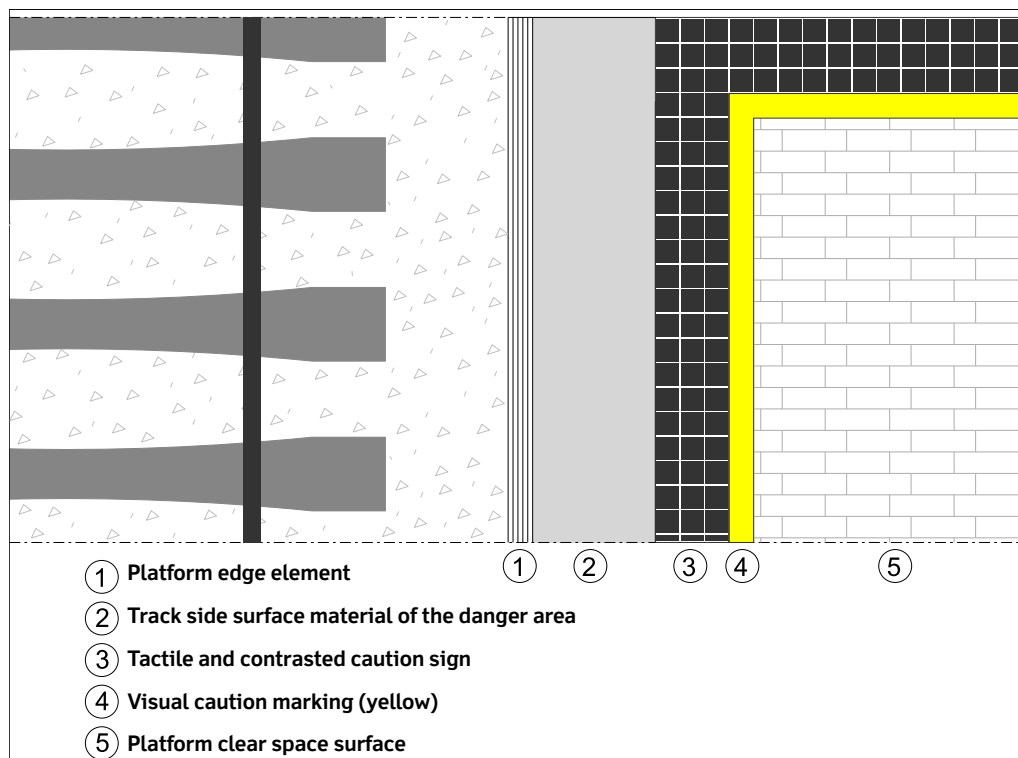
<b>Minimum width of danger area (m)</b>	<b>0.5</b>	<b>1.0</b>	<b>1.5</b>	<b>2.0</b>
<b>Minimum width of tactile danger area marking (mm)</b>	200	300	300	300

The tactile danger area caution marking must stand out by contrast with the surface material of the platform edge on the side of the track. The recommended surface colour is a dark grey or black coating with a contrast ratio to the adjacent surface material of at least 30%. The contrast and width of the surface material of the caution marking must be distinguishable from the tactile marking indicating the obstacle-free route. The recommended tactile caution area is a trimmed or bush-hammer finished cobblestone or a blocked granite plate.

The tactile danger area caution marking should be elevated from the surrounding surface material, in order to ensure detectability during the winter months.

Visual and tactile caution markings detectable with a white cane must be installed at the ends of the platform. If the platform structure ends at a track crossing or service road ramp or other platform structure, the visual and tactile danger area caution markings must continue until the end of the platform. The recommended width of the tactile caution marking at the ends of platforms is 300 mm. A yellow caution marking must be installed at the end of the platform.

The placement of the danger area surface materials and the caution markings at the ends of platforms are indicated in figure 16.5:4



*Figure 16.5:4 Placement of surface materials and warning signs for passenger platform danger areas and placement of caution markings at the ends of platforms*

#### **16.5.2.4 Change of platform height**

The modification of a passenger platform to a height of 550 mm must be designed on the basis of the condition and structure of the existing platform.

Low passenger platforms are usually constructed to incline toward the track. In connection with raising the platform, the inclination direction can be reversed. This must be taken into account in the design of drainage systems.

If the edge of a low passenger platform is constructed from precast concrete units or in situ concrete, the old edge must be dismantled and rebuilt using new precast units at the correct distance from the track centre line.

If the edge of a low passenger platform is of natural stone, the platform may be raised by placing new natural stones over the existing stones at the correct distance from the track.

In the case of sheltered passenger platforms, the requirements on overhead clearance for new and upgraded structures must be taken into account.



If the low passenger platform is connected by stairs or a lift, any changes to the platform inclination or the drainage systems should be designed to avoid the need to renew the structures of connections in question. In the case of low platforms, the possibility of lowering the level of the track must also be assessed, taking into account e.g. the ceiling structures of possible underpasses.

The heightened passenger platform must comply with the requirements of this guideline on the structure and dimensions of passenger platforms.

#### **16.5.2.5      *Wooden passenger platforms***

Wooden passenger platforms may only be used as temporary solutions during e.g. construction. Danger areas and ends of the platform must be indicated in wooden platforms. The platform surface must be slip resistant and anti-reflective.

In wooden platforms, particular attention must be paid to the visibility of the dark gap between the platform and train, as well as other necessary contrast differences. The recommended minimum contrast ratio is 30%.

### **16.5.3 Dimensions**

#### **16.5.3.1      *Length of passenger platform***

The platform length of passenger platform is determined according to traffic-related needs. The platform length should be uniform for stations on the entire railway section and passenger traffic connection. On the same traffic operating point or halt may include platforms of several different lengths, depending on their use.

The standard platform length for long-distance passenger traffic is 350 m. Passenger platforms that are serviced by particularly long trains, such as night trains and international trains, may be 450 m in length. Passenger platforms that are not expected to be serviced by long trains may be 250 m in length.

Local traffic stations outside the commuter train service area may have a platform length of 80 m, 120 m or 250 m. Platform lengths of 80 m and 120 m are suitable for railbus-type traffic operations with trains of three or four traditional-length wagons. Platform length 250 m is suitable for local traffic in urban areas.

In commuter train services, the platform length shall be 270 m or 220 m, depending on the route. These platform lengths are defined according to the needs of electric multiple unit traffic. The separately specified stopping points for so-called rush hour trains shall use a platform length of 350 m.

#### **16.5.3.2      *Width of passenger platform***

The width of passenger platform is determined based on the following factors:

- maximum permitted train speed (width of danger area)
- placements and types of routes
- maximum number of passengers on the platform area
- service traffic
- fixed structures on the passenger platform

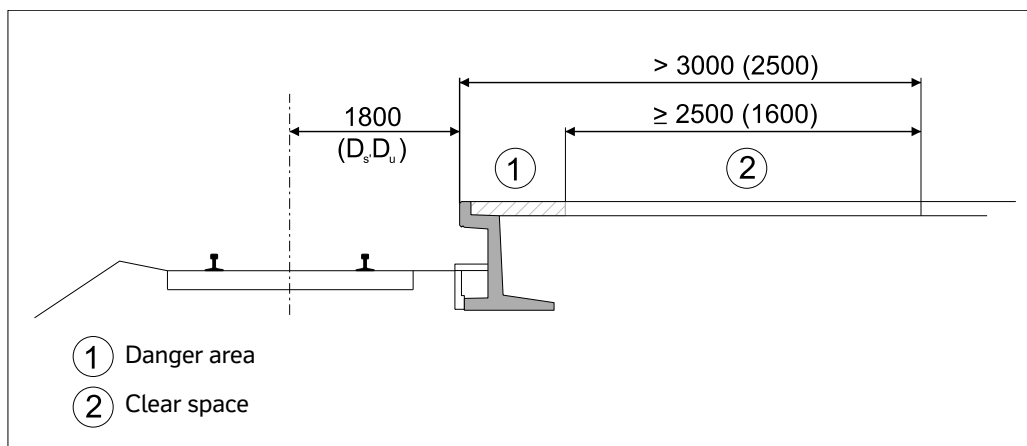
Passenger platform may be side or island platform.

The minimum width of side platform is 2,500 mm, measured from the edge of the platform. The recommended width of side platforms is 3,000 mm. The minimum width of island platforms is 3,300 mm, measured from the edges of the platform.

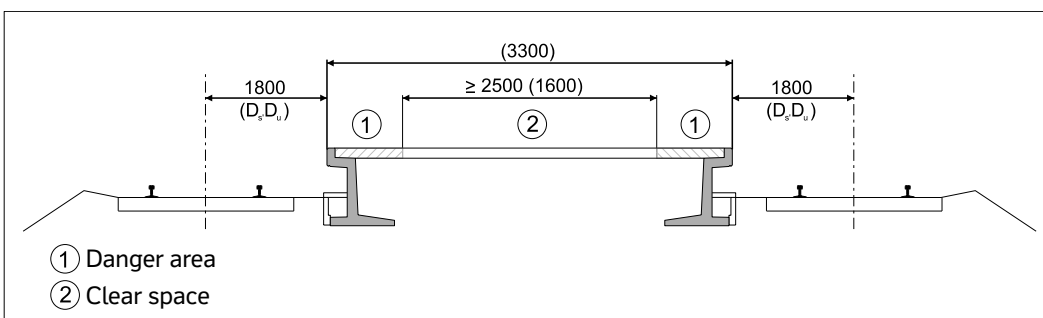
The minimum platform width must include the danger area and clear space.

The minimum width of clear space on side platform is 1,600 mm. The recommended width of clear space between the danger area and the edge opposite the track is 2,500 mm (figure 16.5:5). The minimum width of clear space on island platforms is 1,600 mm between the danger areas on both sides of the platform (figure 16.5:6). The recommended width of clear space between the danger areas is 2,500 mm. At the end of the island platform, the platform may narrow to a width of 2,500 mm.

The clear space between the danger areas must be at least 1,600 mm along the entire length of the platform.



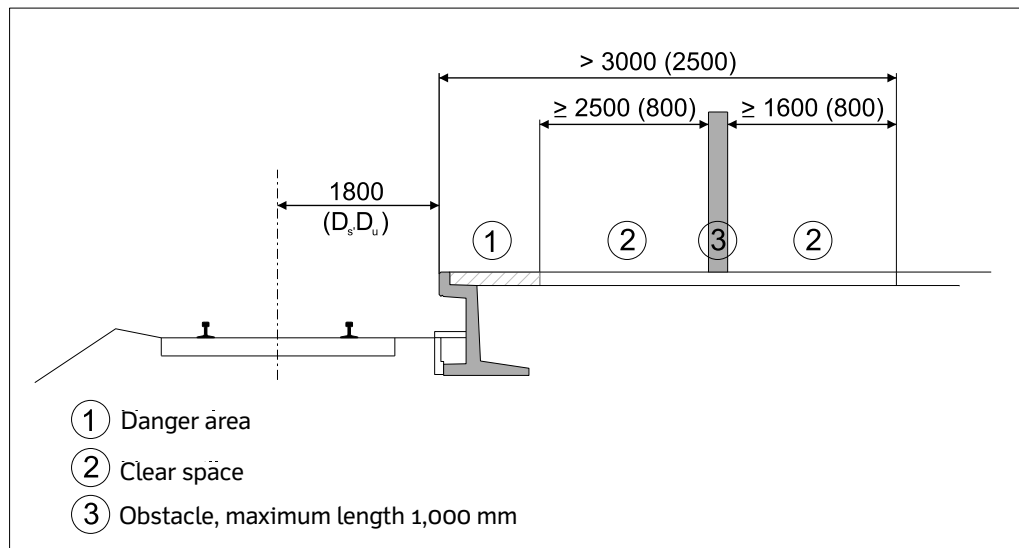
*Figure 16.5:5 Minimum width of single-track platforms without obstacles. Recommended minimum dimensions, with mandatory minimum dimensions in parenthesis.*



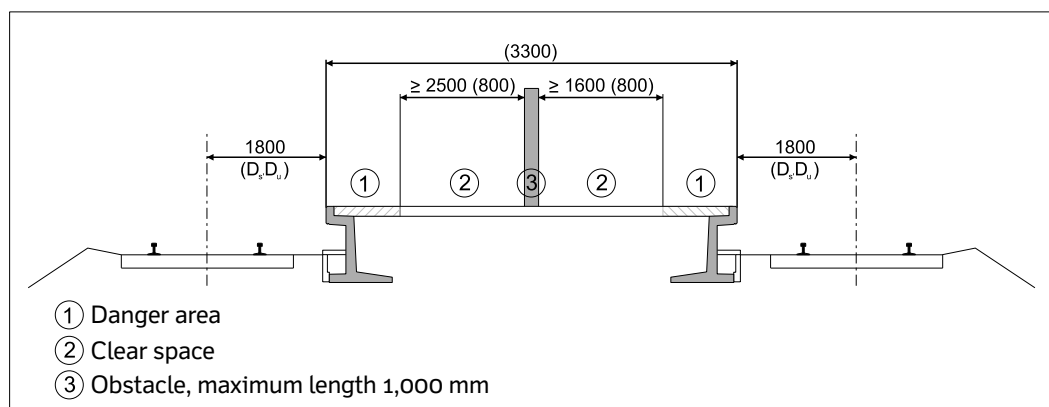
*Figure 16.5:6 Minimum width of island platforms without obstacles. Recommended minimum dimensions, with mandatory minimum dimensions in parenthesis.*

The minimum required clear space of 1,600 mm in width may contain small obstacles of less than 1,000 mm in length, such as signalling system and safety devices. On side and island platforms, obstacles of less than 1,000 mm in length must have at least 800 mm of clear space between the obstacle and the edge of the danger area on the platform side (figures 16.5:7 and 16.5:8). In the case of side platforms, it is recommended that all obstacles be placed outside the platform area. If obstacles

cannot be placed entirely outside the platform area, it is recommended that, in the case of side platforms, a clear space of 2500 mm be included for maintenance and emergency services between the platform side edge of the danger area and any obstacles under 1,000 mm in length. In the case of island platforms, it is recommended that a clear space of 2,500 mm be included on either side of obstacles under 1,000 mm in length for use by maintenance and emergency services. If the distance between two small obstacles is less than 2,400 mm, they are considered to comprise one large obstacle.



*Figure 16.5:7 Minimum width of a side platform with a small obstacle under 1,000 mm in length. Recommended minimum dimensions, with mandatory minimum dimensions in parenthesis.*



*Figure 16.5:8 Minimum width of an island platform with a small obstacle under 1,000 mm in length. Recommended minimum dimensions, with mandatory minimum dimensions in parenthesis.*

Intermediate obstacles between 1,000–10,000 mm in length, such as walls, seats, lifts and stairs, must have at least 1,200 mm of clear space to the edge of the danger area on the side of the platform. In the case of side and island platforms, it is recommended that a clear space of 2,500 mm be included on either side of obstacles for use by maintenance and emergency services. The minimum width of island platform that contains an obstacle longer than 1,000 mm is 4,000 mm (figure 16.5:9).

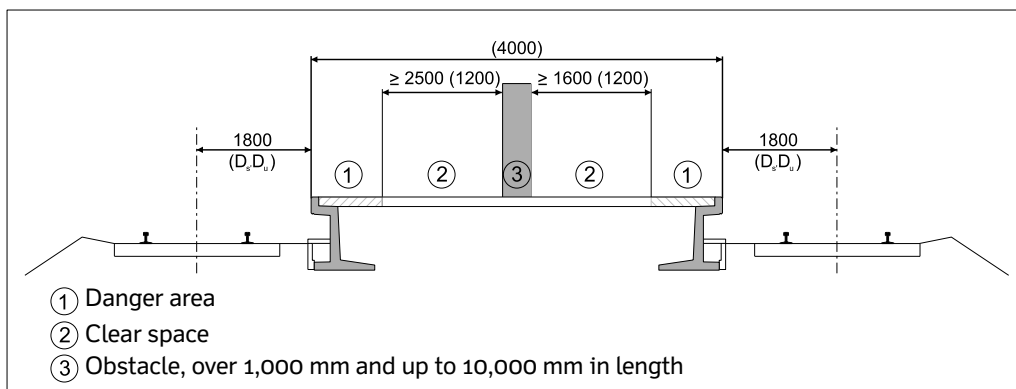


Figure 16.5:9 Minimum width of an island platform with an intermediate size obstacle between 1,000–10,000 mm in length. Recommended minimum dimensions, with mandatory minimum dimensions in parenthesis.

Long obstacles over 10,000 mm in length, such as walls, seats, lifts and stairs, must have at least 1,600 mm of clear space to the edge of the danger area on the side of the platform. It is recommended that both sides of the obstacle have clear space of at least 2,500 mm (figure 16.5:10).

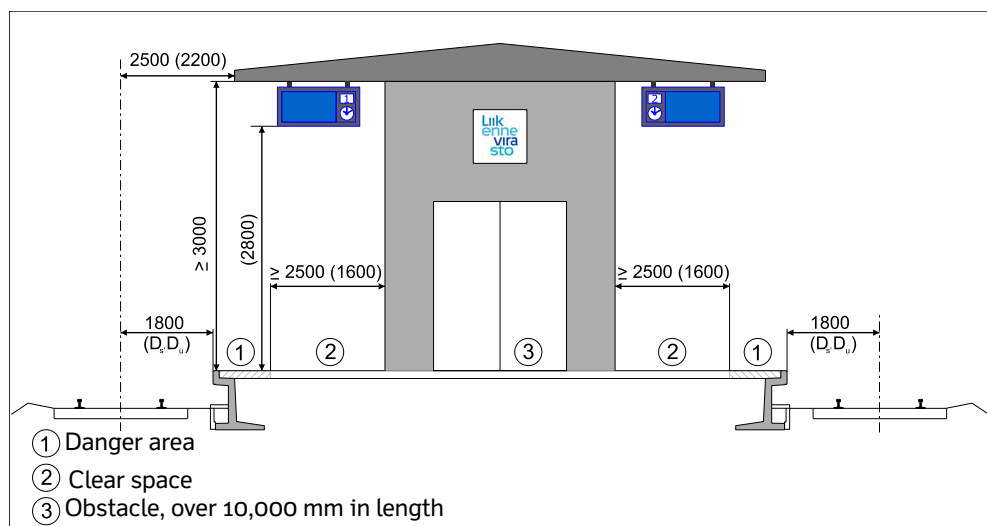


Figure 16.5:10 Minimum width and clear height of an island platform and distance between platform shelter and track, when the platform includes an obstacle over 10,000 mm in length. Recommended minimum dimensions, with mandatory minimum dimensions in parenthesis.

In the event that a clear space of 2,500 mm cannot be achieved for the obstacle, an alternative plan must be prepared concerning maintenance and emergency services for the passenger platform and its access routes. The plan must present the means by which a sufficient level of service can be implemented despite the obstacle.

In addition to the minimum width, the design of passenger platform must take account of additional needs for space due to large numbers of passengers

The actual required width of passenger platform needed is determined based on the following factors:

- The platform must have 1 m<sup>2</sup> of clear floor space for each passenger, according to its maximum planned passenger capacity.
- For obstacles over the length of 1,000 mm, 1,200 mm in width must be reserved for the first 120 passengers and 400 mm of additional space for each subsequent increase of 60 passengers. The initial width of 1,200 mm is included in the minimum platform width. For example, if the planned maximum capacity of the platform is 540 passengers, the total width of the platform shall be 4,000 mm, excluding danger areas.

It is recommended that, during their use, the obstacles do not reduce the amount of clear space below the requirements presented in this RATO guideline. For example, equipment cabinet doors should not open in the direction of the track, and seats should be facing in a direction that ensures sufficient clear space in all situations.

In the case of boarding aid, a clear space of 1,500 mm between the edge of the facility on the side of the platform and any obstacles on the platform or the danger area of the opposite track shall be provided where such facilities are likely to be used. Auxiliary facilities on-board trains are used to allow wheelchair users to board and exit the train. The train personnel must be responsible for the use of auxiliary facilities. New stations must meet this requirement for all trains intended to stop at the platforms.

Auxiliary facilities to assist in boarding may not be installed in new, renewed or upgraded passenger platforms.

#### **16.5.3.3      *Bearing capacity of structures***

The bearing capacity of passenger platform must be designed on a case-by-case basis, taking into account the possible use of the platform by service vehicles and other traffic, such as emergency vehicles.

Vertical structures located within passenger platform, including staircase and lift walls and shelter support pillars must be designed to withstand an impact load of 25 kN. The impact load is presumed to have an effect at a height of 0–1 metres from the platform level. Structures may be protected with separate roadside barrier at a height of 0.5 metres with a design load of at least 0.5 MN. In such a case, the structure does not need to be designed to withstand an impact load.

In each case, it must be assessed whether the passenger platform must be dimensioned to accommodate the load of road-going or emergency crane trucks, for example in the vicinity of high-rise buildings.

If buildings are constructed over the passenger platform, a separate report must be prepared on the bearing capacity and impact load resistance of the platform structures, taking account of potential impact loads caused by the derailment of a train /23/.

#### **16.5.3.4      *Dimensions of passenger platform foundation***

Platform structures must be designed in accordance with the quality specifications of Infra RYL, taking into account the particular soil and base conditions. The thickness and properties of structures must be determined by a geotechnical designer on the basis of a geotechnical assessment on the bearing capacity and frost heaving of the soil. The selection of structures must take account of the stability and consolidation of the platform.

The long-term consolidation of a ground-supported platform may not exceed 70 mm, and the threshold value for angular motion may not exceed 1/800. If the consolidation values in geotechnical calculations are exceeded, the platform must be constructed as ground-supported over a reinforced ground or as a load-bearing structure. The platform may be fully (piled structure) or partially load-bearing; in the latter case, the support wall of the platform edge and the danger area are load-bearing structures, and other platform sections ground-supported structures.

The parameters used in the consolidation calculation must be measured by an oedometer test or other reliable means.

The structures of passenger platforms shall be constructed on frost resistant soil or a frost resistant soil structure implemented on the frost limit, or the platform structures must include frost insulation. The design dimensions of frost insulation and frost limit are based on the statistical average of freeze conditions that occur once per 50 years, as defined in Part 3 of the RATO Guidelines on Track structure /24/. The design of the frost insulation is determined by the geotechnical designer, taking into account the particular local conditions.

The filling layers of platform structures must be compacted to the density specified by the geotechnical designer and measured by a Proctor compaction test. If the geotechnical designer does not specify a density for the filling layers, they must be compacted to a density of at least 92%, as measured by a modified Proctor test, or to a bearing capacity value of  $E_2 > 90 \text{ MN/m}^2$  and  $E_2/E_1 < 2.2$ .

#### **16.5.3.5      *Lateral inclination and drainage***

With the exception of wooden platforms, the lateral inclination of passenger platforms is 2.5%.

New and upgraded side and island platforms must be inclined away from tracks in operation. In the case of island platforms, this means that the platform is inclined towards its centre. This requires the use of drainage whose functionality must be ensured in all conditions, including very low temperatures. If only one side of the island platform is in use, the platform should be inclined away from the track in operation.

In the case of renewed island platforms, the inclination may be toward or away from tracks in operation, depending on the circumstances of the location.

Wooden passenger platforms do not have lateral inclination. Wooden platforms must be constructed of boards that run parallel to the tracks at horizontal level. The boards must have air gaps of approximately 10 mm in width.

#### **16.5.3.6      *End of passenger platform***

The end of a passenger platform must be ramped unless the platform ends at a wall or other structure. The placement of structures at the end of a platform must take into account the width requirements of the structural gauge. If a structure must be placed partially inside the structural gauge, a permit to deviate from Part 2 of the RATO Guidelines must be sought from the Finnish Transport Agency.

The end of a ramped platform must be reserved space for ploughed snow, taking into account the visibility of trains. The ramp at the platform end must have a gradient of 1:12.5 (three ramp elements for a high platform). If the ramp is used for service and emergency traffic, its minimum width is 3 m.

The corners and ends of platforms must be constructed using precast units intended for corners and ends /20/.

The platform end must be equipped with a barrier to prevent public access or with visual and tactile horizontal warning signs that can be detected with a white cane. The barrier to prevent public access may not interfere with potential service or emergency traffic to the platform.

#### **16.5.3.7      *Protection of structures***

If necessary, the passenger platform structures or items placed on the platform may be equipped with structural guards to protect them from damage caused by e.g. maintenance equipment.

Lamp posts and other poles may be protected with a guard frame mounted on the platform surface that encloses the pole.

The foundations of electric railway poles must be protected by an open-top guard frame around the foundation, in order to allow access to the anchor bolts if necessary.

The requirement for structural guards to stand out by contrast with their environment shall be determined on a case-by-case basis.

#### **16.5.3.8      *Wooden passenger platforms***

The width and length of wooden passenger platforms must comply with the requirements of sections 16.5.3.1 and 16.5.3.2

The minimum bearing capacity of the platform is 4 kN/m<sup>2</sup>.

Machinery and other vehicles may not drive on wooden platforms.

## 16.6 Platform shelters and waiting areas

All passenger platforms must have a weather-protected area.

Objects that have protrusions of a distance of over 150 mm at a height of below 2,100 mm must be marked with an indicator that is placed at a height of at most 100 mm from the floor or ground surface in order to be detectable with a white cane. The marking must stand out by contrast with its environment.

Transparent doors and walls on platform waiting areas and shelters must be equipped with highlighted markings, as specified in section 16.3.2.3.

It is recommended that the surfaces of shelters and waiting areas on platforms are made distinguishable from their surrounding platform surface materials, for example by using a different type of paving.

Platform shelters, waiting areas and stop shelters situated in platform areas must be earthed in accordance with the instructions of Finnish Transport Agency guideline 13/2010 /25/.

### 16.6.1 Platform shelter

It is recommended that platform shelters are only being built in stations other than low-traffic stations.

The design of the platform shelter must take account of the potential for vandalism.

Platform shelters must be primarily constructed of fire-resistant or fire-retardant materials.

A weather-protected waiting area must be constructed in connection with the shelter.

The load-bearing structures of the platform shelter must be located within a zone that stand out by contrast with its surrounding environment both visually and in terms of surface material.

The construction of low-rise shelters with a nearly horizontal glass ceiling should be avoided in order to prevent nuisance caused by reflected light. Shelters with a curved glass ceiling do not usually have harmful reflective properties.

Wire and cable routings that lead to the roof of the shelter must be kept locked, and the use of such routings must ensure that the electric track conductor is de-energised.

The design and construction of platform shelters must take account of the visibility and placement of signals, static and dynamic signs and track signs, and requirements related to service traffic, maintenance equipment and structure gauge.



#### **16.6.1.1**      *Height of platform shelter*

The minimum height of the platform shelter is set as the height required by the standard vehicle, however no less than 2,800 mm. The recommended minimum height of shelters is 3,000 mm. The shelter height must take account of the height requirements of its attached objects and the platform surface, as well as the required installation heights of signals /26/. Hanging objects such as signals may not be installed at a height of less than 2,800 mm.

#### **16.6.1.2**      *Coverage of platform shelter*

The length of the platform shelter and its placement on the length of the platform are determined based on the typical train length and number of passengers for the platform.

It is recommended that the shelter extend to the edge of the danger area on the side of the platform. The minimum distance between the edge of the platform shelter and the centre line of a straight track is 2,200 mm for side lines and 2,500 mm for the main line. The minimum width between the shelter and tracks must take account of structure gauge requirements for curved and canted tracks /19/.

### **16.6.2 Waiting areas**

Waiting areas on passenger platforms must be designed to be transparent and well-lit in order to provide an increased sense of security.

The waiting area must be weather protected but does not need to be thermally insulated or heated.

The windows and glass walls of waiting areas must be frost-resistant.

The size of the waiting area must be designed so as to fit at least 15% of the presumed number of simultaneously waiting passengers.

The interior of the waiting area must comply with the requirements of section 16.7.

It is recommended that passenger information displays be visible from the waiting area or the waiting area be equipped with a display, and that the audibility of announcements within the waiting area meet the related requirements.

### **16.6.3 Stop shelter**

Stop shelters are recommended to be built at low-traffic stations, instead of a platform shelter and waiting area.

The design of the stop shelter must take account of the potential for vandalism.

Stop shelters must be primarily constructed of fire-resistant or fire-retardant materials. The use of wood as material for stop shelters must be agreed separately with the Finnish Transport Agency.

Stop shelters shall be placed along the section of the platform where a majority of trains are planned to stop. This section is usually located close to the access routes to the platform, or at the halfway point of the length of the platform.

The number of stop shelters must be designed so as to fit at least 15% of the presumed number of simultaneously waiting passengers.

In the case of island platforms, the stop shelter may also be placed at the end of the platform and be excluded from the length of the platform, in which case the requirements on platform width are waived. Access to the platform must be arranged from the same end as the stop shelter and must ensure a minimum clear width of the platform of 1,600 mm, if the route to the platform passes the stop shelter.

The stop shelter must be designed to protect from wind and weather. The stop shelter must be designed as transparent as possible to increase the sense of security.

The interior of the stop shelter must comply with the requirements of section 16.7.

## **16.7 Furniture and free-standing devices**

Furniture and free-standing devices within the station area must be positioned in a manner that does not obstruct the movement of blind or visually impaired persons. Persons using a white cane must be able to detect all furniture and free-standing devices within the station area.

Furniture should be situated on a surface that stands out by contrasts with the surrounding station and platform area in terms of its colour and surface material and placed inside a waiting area or stop shelter. Furniture must stand out by contrast with their background. The recommended minimum contrast ratio is 30%.

Furniture shall have rounded edges.

Furniture and free-standing devices may not be placed in danger areas or clear space areas. The use of furniture or free-standing devices may not require entering the danger area.

### **16.7.1 Seats**

Each passenger platform and rest area must include at least one weather protected area with ergonomic seats.

At least one third of the seats must be equipped with armrests and back support.

Waiting areas, stop shelters and rest areas must include a space for wheelchairs that is indicated with the international symbol of access /27/.

The seats must be at a height of 400–550 mm from the floor or ground surface. It is recommended that seats of several different types and heights be included within the station area. The material and structure of seats must withstand vandalism but be comfortable for sitting.

The number of seats and their placement on the platforms must be designed to account for the expected passengers of the station. It is recommended that seats be placed at intervals of 50 m on obstacle-free routes and particularly in connection with level changes.

It is recommended that seats be equipped with armrests, both to facilitate sitting and standing up and to prevent the seats from being used for lying.

Seats on passenger platforms must be placed outside the danger areas and clear spaces, or outside the platform area. Seats must be either fixed or attachable/removable for maintenance purposes.

Seats should also be included at the connecting traffic waiting area.

### **16.7.2 Timetable and information holders**

Timetable and passenger information holders must comply with the guidelines of the Finnish Transport Agency /26/.

Timetable and information holders must be located where they are easily accessible, in the vicinity of routes to and from the passenger platforms.

The bottom edge of the holders must be protected by a barrier or highlighted bar of a height of approx. 300 mm, to ensure that a person using a white cane is able to detect the holder.

Traffic-related information and instructions must be clearly distinguishable from advertisements. Information related to public transport services is not considered advertising.

### **16.7.3 Ticket vending machines**

The placement of ticket vending machines in the station area must take account of accessibility and obstacle-free routes.

Obstacle-free routes must include at least one ticket vending machine with an user interface that is easily reachable by wheelchair users and persons of with short stature.

The accessible ticket vending machine user interface must include, at a minimum, the controls necessary for purchasing tickets as well as a payment terminal and ticket printer. The user interface of an accessible ticket vending machine may consist of buttons or a touchscreen, or a combination of these. Options related to the ticket purchase must be clearly distinguishable and selectable.

The user interface of an accessible ticket vending machine must be located at a height between 800 mm and 1,200 mm. The user interface must be located as close to the front edge of the accessible ticket vending machine as possible.

A turning space of a minimum of 1,500 x 1,500 mm in front of the accessible ticket machine must be reserved for wheelchair users.

In the design and procurement of new accessible ticket vending machines, it is recommended that disability associations are consulted on the needs of persons with disabilities and persons with reduced mobility concerning the use of the ticket vending machine.

The owner of a new accessible ticket vending machine must request a statement from the Finnish Transport Agency approving the use of the machine in the station areas of traffic operating points or halts in the state-owned railway network.

### **16.7.4 Service and ticket sales desks**

The ticket sales counters, information desks and customer assistance points in new and upgraded station buildings or station areas must be located along obstacle-free routes. A minimum of one of the service or ticket sales desks must be accessible to wheelchair users and people with short stature.

A minimum of one accessible desk must be fitted with an induction loop system. The induction loop systems must be fixed installations.

The height of upper surface of accessible desks must be at least 740 mm and no more than 800 mm. The clear height below the desk must be at least 700 mm.

The minimum width of accessible desks is 1,000 mm.

The front of accessible desks must have a turning space for wheelchairs of at least 1,500 mm in radius.

Accessible desks must have a depth of at least 600 mm to ensure sufficient legroom for wheelchair users.

#### **16.7.5 Other furniture**

Platform areas must be equipped with a sufficient number of vandal proof litter bins and ashtrays in relation to their passenger numbers. Litter bins and ashtrays must be attached to poles or other structures and must be detectable with a white cane. The use of self-extinguishing litter bins is recommended. Recycling bins are recommended for platforms in high-traffic stations. Sheltered platforms shall not be equipped with ashtrays.

Other furniture may be placed on the platform area on a case-by-case basis, with the separate agreement of the Finnish Transport Agency.

Boarding aids are not recommend to be placed in platform areas.

## 16.8 Guidance, signs and information systems

### 16.8.1 Principles

All routes to the station area, including car-carrier loading platforms, shall be marked with sufficiently clear and precise guides and signs. Information must be provided at all points where passengers must decide between two or more directions. The maximum distance between direction signs along routes within the station area shall be 100 metres. Signs, symbols and pictograms must be used in a coherent manner along the full extent of the route.

In designing guidance, direction information is sufficient when further away from the destination. In points where travellers must select between two or more directions, guidance must provide sufficient information to ensure correct decisions.

Static signs installed within the station area must be designed in accordance with the instructions of the Finnish Transport Agency /26, 28/. The guidance system must be based on a coherent visual appearance, with white text on a blue background used as the basic design.

Readable signs and passenger information must be positioned to ensure sufficient clear space for standing or wheelchair users.

The bases of signs and information boards mounted on the floor and ground must include a batten that is identifiable using a white cane. The batten must be situated at a height of 60–100 mm from the ground or floor. The lower sections of timetable and information holders mounted on the floor or ground shall be protected as specified in section 16.7.2.

Signs and information boards must be placed along obstacle-free routes.

Guidance for the use of connecting traffic must be provided wherever means of connecting traffic are available.

At least one part of the station area must provide an information on departing trains, such as in the form of a timetable holder, placed at a height of at most 1,600 mm. The information on departing trains must include information on the destination, stops, and time and track of departure of trains. The information on departing trains must be placed along an obstacle-free route.

All information on public transport provided at a station must be uniform, regardless of its presentation method.

Route information and advertisements shall be set apart by separate displays or, if presented on a single display, by displaying them at different times.

### **16.8.2 Information to be presented**

Instructions for emergency situations must be presented within the station area. The content and presentation method of instructions for emergency situations shall be determined case-by-case basis with the Finnish Transport Agency. The instructions for emergency situations include information on the marking of emergency exits in station buildings and underground stations.

Advertisements may not be presented in a manner similar to safety announcements.

Information must be presented on the signs for warnings, prohibitions and mandatory actions used within the station area. New and renewed warning, prohibition and mandatory action signs must comply with Government Decree 687/2015 on safety signs in workplaces and their minimum requirements /29/.

With the exception of service and emergency traffic, it is recommended that vehicle traffic on the passenger platforms be prohibited with road signs in accordance with *Tieliikenneasetus* (Decree on road signs) /30/.

The prohibitory sign used shall be road sign 311 – closed to all vehicles. The road sign in question also prohibits the use of bicycles on the passenger platform. The prohibitory sign is placed on the right side of the route or road, if possible. In connection with road sign 311, various additional signs may be used to permit access to the required vehicle traffic on the passenger platform area. In bilingual municipalities, signs must also be provided in Swedish. The following additional signs may be used:

- *Ei koske radanpidon huoltoajoa* – Railway service traffic permitted. Used when only access by vehicles required for railway service work must be permitted
- *Ei koske huoltoajoneuvoja* – Service traffic permitted. Used when access by service vehicles to the platform area must be permitted
- *Ei koske huoltoajoneuvoja ja liikkumisesteisten saattokuljetusta* – Service traffic and disabled transport permitted. Used in areas where the drop-off point for connecting traffic is situated unreasonably far from the passenger platform or the route from the drop-off point is not free of obstacles. The sign may also be used to permit only railway service vehicles and disabled transport.

The recommended road sign for drop-off points for connecting traffic is either 372 – no parking or 521 – parking. The recommended additional sign is 854 – time limit for parking or 855 – obligatory use of parking disc. /30/

Accessible toilets that are equipped with a hinged handle must include a pictogram that demonstrates the handle in both stowed and deployed positions.

### **16.8.3 Visual information**

Visual information must be readable in all lighting conditions during the opening hours of the station area. The letters, symbols and pictograms of visual information must stand out by contrast with their background. The recommended minimum contrast ratio is 30%.

Time information presented in digits must be in the 24 hour system.

The typeface used in all textual information must be easily readable. It is recommended that the textual information in signs is presented using a sans-serif typeface and both uppercase and lowercase letters. To ensure clarity and readability, the first letters of texts in signs must always be capitalised. Texts may not be written using only uppercase letters.

Passenger platforms must always be provided with a guided route.

Guidance must be placed to be readable without entering danger areas on the platforms.

Guidance must be implemented in accordance with the guidelines of the Finnish Transport Agency /26, 28/.

#### **16.8.3.1      *Display devices***

New display devices must be of a type that have been approved as interoperability constituents for infrastructure.

Display devices must be sized to show individual station names or words of messages. Display devices may also present notifications related to train traffic or disturbances. All information presented must be displayed for a minimum of 2 seconds.

If a scrolling display is used (either horizontal or vertical), each complete word shall be displayed for a minimum of 2 seconds. The horizontal scrolling speed shall not exceed 6 characters per second.

Displays must be designed and installed for an area of use that meets the requirements of the maximum viewing distance. The maximum viewing distance is determined using formula 16.9.1

$$\frac{\text{reading distance (mm)}}{250} = \text{font size} \quad (16.9:1)$$

For example: 10,000 mm / 250 = 40 mm.

The content of potentially changing visual information must be uniform with respect to all essential spoken announcements.

Display devices must be installed in such a way as to be anti-reflective within their viewing area.

#### **16.8.3.2      *Symbols***

The station area must be equipped with the following pictograms concerning persons with disabilities and persons with reduced mobility:

- the international symbol of access (ISA) for wheelchair users /27/
- directional information for obstacle-free routes and services suitable for wheelchair users
- indication of wheelchair accessible toilets and other services if provided



- if there is train assembly information on the platform, it should include an indication of the wheelchair boarding location
- induction loops, where applicable /31/.

The symbols can be combined with other symbols, for example lifts, toilets, etc.

#### **16.8.3.3      *Warning announcements on platforms***

Passenger platforms with a maximum train speed of over 160 km/h must be equipped with automatic public address systems and display devices to provide warning announcements of all passing trains. Text on display devices must be illuminated and presented in both Finnish and Swedish. Spoken announcements on rail traffic must be presented in the official languages of the municipality, with the majority language presented first.

Passenger platforms with poor visibility of trains or other factors endangering safety must be equipped with said safety devices regardless of the maximum speed of trains. Such requirements are agreed on a case-by-case basis with the Finnish Transport Agency.

The train warning system must be set to begin the announcement of a passing train once the driving time of the train is 45–60 seconds to the arrival direction end of the passenger platform. The text may be displayed in one language at a time.

#### **16.8.4 Track signs**

Requirements for the use of track signs within the station area are presented in Part 17 of the RATO Guidelines on Track signs and markings /32/. Track signs within the station area may not disturb obstacle-free routes or interfere with the visibility of direction signs.

#### **16.8.5 Static guidance**

Guidance within the station area must be designed in accordance with the guidelines of the Finnish Transport Agency /26, 28/.

Passenger platforms should be indicated with track numbering, where possible. Track numbering shall use as few digits as necessary to differentiate between tracks. For example, tracks numbered 001 and 011 on the same traffic operating point or halt are presented as digits 1 and 11. Track numbers 341 and 342 shall be presented as digits 1 and 2. Track number identifiers are determined according to Part 6 of the RATO Guidelines on Signalling systems /14/.

The name of the rail traffic operating point or its part must be presented on the passenger platform. The trade name of the traffic operating point may be presented instead of the full name of the traffic operating point in cases where the Finnish Transport Agency has approved a separate trade name. The names must be presented in the official languages of the municipality in the official order.

Passenger platforms must be divided into lengthwise sectors that are lettered from A to D. The length of the sections of passenger platforms shall be approximately 50 m

for local traffic and 100 m for long-distance traffic. The sector letters shall correspond to the signs indicating the stopping points of trains. /28/

#### **16.8.6 Tactile information**

Tactile information and signage must be designed of materials that are pleasant to the touch and resistant to weather conditions and vandalism.

All information, lettering and symbols must be clearly identifiable.

##### **16.8.6.1      *Braille signs***

Necessary information must be presented along the obstacle-free route to the platform and on the platform in Braille, or in prismatic letters or numbers.

At least the platform number and direction information must be presented.

Tactile information must be presented on the handrails of stairs and ramps to platforms on at least the back surface of the uppermost handrail, or on the wall. The recommended height of tactile information signs other than that positioned on the handrail is between 1,300 mm and 1,400 mm.

##### **16.8.6.2      *Tactile map***

A minimum of one tactile map must be placed along obstacle-free routes in new station areas.

Obstacle-free routes constructed for renewed or upgraded station areas must include a tactile map.

A tactile map should be installed in renewed or upgraded station areas, even if an obstacle-free route is not constructed.

The tactile map must be placed in a central location from which there is access to all platforms in the station area. The recommended placement for the tactile map is a weather protected area near the entrance to the station area. The tactile map should be equipped with an audible beacon to make it easier to locate.

The tactile map must present the obstacle-free routes of the station area and their connected services and functions, vertical circulation, place names and compass points. The information on the tactile map must be provided in at least two languages (Finnish and Swedish). Braille lettering shall be provided in at least Finnish. The Finnish Transport Agency shall determine the use of English and Russian on tactile maps on a case-by-case basis.

The tactile map must be installed at a height of 900 to 1,500 mm from the ground or floor. The tactile map may be installed on a separate pedestal or mounted on a wall. The tactile map must be installed at a vertical angle of 15 degrees.

#### **16.8.7 Other information and guidance**

It is recommended that the station area include signage and guidance on the station services, as detailed in the Finnish Transport Agency guidelines /28/.

It is recommended that the timetables of connecting bus or tram traffic be presented in the station area.

Tactile signs in toilet facilities must provide functional information and instructions on calling for aid if necessary. The information must be presented alongside the light switch located next to the toilet door.

The lift controls on the interior and exterior of the lift cage must have a tactile surface, or, alternatively, tactile signs and information on the lift controls and functional information must be included alongside the controls. The lift controls must at least include tactile information on the lift direction (whether up or down), floor numbers and the emergency button.

The recommended location of the customer assistance point within the station area is a weather protected area in the vicinity of the drop-off point, and as close as possible to the passenger platform nearest to the drop-off point and connecting traffic area. The location of the customer assistance point within the station area must be agreed with the Finnish Transport Agency, the rail traffic operator and, if necessary, the local authority. The Finnish Transport Agency shall be responsible for the placement and installation of sign on the customer assistance point.

#### **16.8.8 Audible information**

##### **16.8.8.1      *Sound quality***

Spoken information shall have a minimum STIPA level of 0.45 in all areas of the station /33/.

The content of spoken information must be uniform and include all essential visual notifications.

In the event that spoken announcements are not automatically provided, passengers must receive information by an audible public address system upon request.

Information pertaining to safety shall be provided through spoken announcements within the station building. At a minimum, this includes evacuation orders and fire alarms.

The public address system must be designed so as not to cause an unnecessary nuisance in the surrounding environment.

Designs for the announcements for station areas must take account of the Finnish Transport Agency requirements and design guidelines on public address systems /34/.

##### **16.8.8.2      *Induction loop system***

The availability of induction loops in the station area must be indicated by a symbol complying with the IEC standard /31/. Induction loops must be fitted on platforms or elsewhere in the station area in connection with public transport timetables and passenger information systems. It is recommended that a coverage map for induction loops be designed for new and upgraded stations.

The structures, dimensions and installation methods and instructions for induction loop systems must be specified by the designer. The design of induction loop systems must take account of electromagnetic field simulation results, parameters affecting the choice of amplifier, and the type of looped cable used. The implementation and final testing of induction loop systems must comply with the requirements of standard SFS-EN 60118-4 /18/.

## 16.9 Lighting

New and upgraded station areas must be fitted with uniform lighting. Entrances must be more brightly illuminated than their surrounding environment, but sudden changes in illuminance should be avoided. Lighting must be designed to eliminate any dark areas or corners within the station area. The colour temperature of lighting must be as uniform as possible throughout the station area. Significant differences in illuminance should be avoided. The lighting may not be glaring.

The aim is that areas administered by the Finnish Transport Agency and the premises and routes of their adjoining properties must have a uniform level of lighting.

Passenger platforms must have sufficient lighting to ensure that visually impaired persons are able to identify signs and texts and read timetables and other passenger information. Different surfaces must stand out by contrast with each other and the gap between the train and the platform danger area must be clearly identifiable.

Horizontal ground-level lighting on obstacle-free routes within the station building and platform must have a minimum illuminance of 100 lx.

Obstacle-free routes leading to and from the platforms must have a minimum illuminance of 50 lx.

Routes within the station area other than obstacle-free routes must have a minimum illuminance of 10 lx.

Points along the routes that contain detailed information must be emphasised using lighting with a greater illuminance of 15 lx or more in comparison with their surroundings. The colour temperature of such additional lighting must differ from its surrounding area.

The minimum illuminance of sheltered stairs must be 100 lx. The recommended illuminance for stairs in outdoor areas is 100–150 lx.

The recommended illuminance for stairs in indoor areas is 300 lx.

Unsheltered stairs must have a minimum illuminance of 50 lx, with a recommended illuminance of 100 lx.

The exit level of escalators must have a minimum illuminance of 100 lx, with a recommended illuminance of 300 lx.

Platform shelters, passenger waiting shelters and waiting areas on platforms must have a minimum illuminance of 100 lx. For these areas, the recommendation is to use general lighting with an illuminance of 30–50 lx greater than the surrounding platform area. The illuminance of timetables and other notifications in shelters or waiting areas must be at least 15 lx greater than the general level of illuminance of the shelter or area.

Lighting fixtures must be placed outside the structure gauge in a manner that ensures that no shadow is cast by passengers on the gap between the train and platform, and that passengers alighting the train are not blinded by the lighting. The placement of lighting fixtures must be designed to ensure that maintenance personnel are not required to work within 3.0 metres of any energised parts of the electric railway.

In other respects, the design of lighting must comply with the Finnish Transport Agency design guidelines on highway and railway area lighting /35/.

Emergency lighting in the station building must provide sufficient visibility for evacuation and the identification of fire-fighting and safety equipment. Emergency lighting must be designed in compliance with current regulations.

The lighting of loading platforms is recommended to be designed according to the Finnish Transport Agency guidelines on lighting /35/.

## 16.10 Station building

This section describes the particular requirements for station buildings to supplement the requirements and recommendations presented in other sections.

Station buildings in new and upgraded station areas must be accessible by an obstacle-free route.

Within the station buildings there must be no irregularities in excess of 5 mm at any given point in floor walking surface areas, except for tactile walking surface indicators, drainage channels and possible thresholds at doors.

The floor surfaces of station buildings must be slip resistant and anti-reflective.

## 16.11 Loading platforms

The placement, width, length and structure of loading platforms are determined according to the requirements of traffic.

The objective is that loading shall be done with the greatest possible degree of smoothly and safety, while taking account of the requirements of rolling stock and track maintenance.

### 16.11.1 Placement

New loading platforms may be placed along tracks with a maximum speed of 50 km/h.

Access to the loading platforms should be created in such a way as to avoid the use of level crossings. In cargo terminal areas, this is not always possible.

Loading platforms must be placed along tracks that are not used by passing trains.

The side platform should generally be situated at the halfway point of the loading track along a straight section of the track. The platform must be at a distance of 1,920 mm +40/-60 from the centre line of the track. If placed alongside a curved track without a cant, the distance of a platform on the inside or outside of the curve is calculated using formula 16.11:1.

$$d_u = d_s = 1920 + \frac{36000}{R} \quad (16.11:1)$$

$d_u, d_s$  = platform distance from track centre (mm)  
 $R$  = curve radius (m)

On track transition and exterior side of the curves, the width is expanded according to the structure gauge requirements.

In exceptional cases, the side platform may be placed alongside a loading track at a distance of 1,750 mm from the track centre line. In such cases, the following requirements must be met:

- the platform must be placed on a straight section of track
- the opposite side of the track may not contain obstacles under 2.5 metres from the track centre line
- the maximum lateral deviation of the platform edge is +100/-0 mm
- the maximum vertical deviation of the platform is  $\pm 30$  mm
- both ends of the platform are marked by a structure gauge restrictive sign T-350A in accordance with RATO 17 on track signs

Temporary loading platforms placed along the main line must be at a minimum distance of 2,500 mm from the track centre line on railway yards and 3,100 mm on rail lines. The corresponding distances for curved track sections and their immediate vicinities are determined according to formulas (16.11:2) and (16.11:3) and structure gauge requirements.



$$d_s = 2300 + \frac{190}{R} \geq 3100 + \frac{36000}{R} \quad (16.11:3)$$

$d_u, d_s$  = platform distance from track centre (mm)  
 $R$  = curve radius (m)

The recommended normal gradient value of tracks adjacent to loading platforms shall be 1.5‰. The maximum gradient of the track shall be 2.5‰.

### 16.11.2 Dimensions

The total length and width of the loading platform is determined according to its purpose of use. If the loading platform is in connection with a building and equipped with a shelter, the solution presented in figure 16.11:1 is recommended.

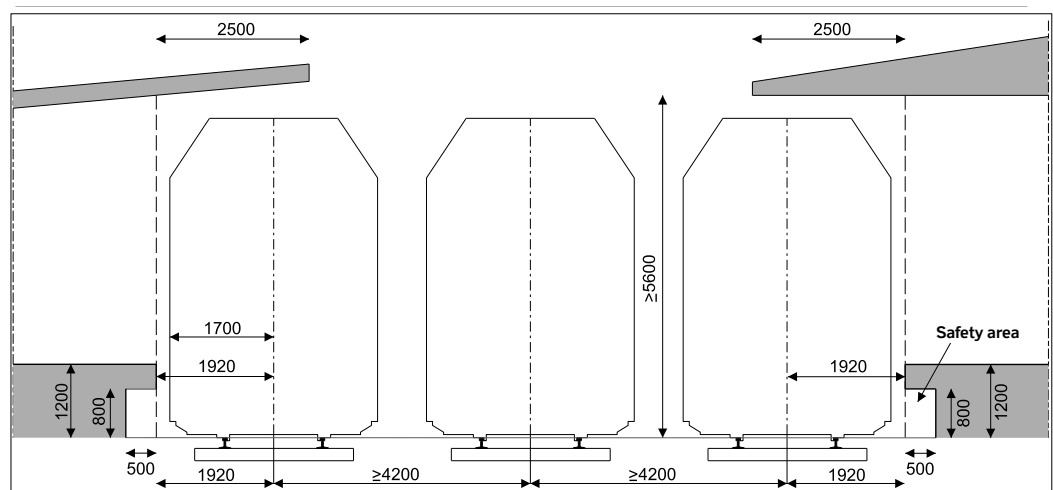


Figure 16.11:1 Loading platform in connection with a building

With the exception of special platforms, the height of loading platforms must be 1,200 mm, measured from the top of the rail. The minimum width of loading platforms must be 3.0 m. The floor height of freight wagons is typically 1,240–1,340 mm from the top of the rail.

The width of the ramp to the loading platform must be at least 3.0 m to ensure access for service traffic.

The height of the shelters must be  $\geq 5.6$  m from the top of the rail. In other respects, the requirements for doors and gateways in Part 2 of the RATO Guidelines on Track geometry must be observed /19/.

**16.11.2.1 Length**

The length of the loading platform must be determined according to the length of the horizontal section on the side of the track.

Side platforms for the loading of parcelled goods must typically be constructed to extend the length of the rake of the wagons.

The loading platform must have sufficient available length to permit the safe use of loading equipment.

**16.11.2.2 Width**

The width of a side loading platform is dependent on the direction of the access ramps to the platform and the type of loading equipment used. It is recommended that the loading of freight wagons be handled horizontally at the same height as the wagon floor (i.e. not on a ramp), in order to ensure that the loading vehicle does not tilt and lose traction, resulting in the unbalancing of the load.

The minimum width of dead-end loading platforms must be 3.5 m. The minimum space between possible edge beams must be 3.0 m.

**16.11.2.3 Structure**

If loading platforms are situated on both sides of a track, or on the one side of the wagons to be loaded, the distance between the track centre and platform edge must be  $\leq 1,920$  mm. A safety area of 500 in depth and 800 mm in height must be included below the platform (or one of the platforms, if on both sides) along the entire length of the platform, as indicated in figure 16.11.1.

The dimensions of loading platforms must be in accordance with the load classification for parking and rest areas in the Finnish Transport Agency guideline on road pavement structure design /36/.

Dead-end platforms must always be equipped with buffers capable of withstanding a minimum impact load of 200 kN. The midpoint of the buffers must be at a height of 940-1,045 mm from the top of the rail. Loading must take place over the buffers with the use of loading bridges. The design, installation and use of the buffers must comply with the requirements of Part 11 of the RATO Guidelines on Railway superstructure /37/. The loading bridge and buffers must be designed to withstand a force of 100 kN of vehicle traffic axle loads.

The dead-end loading platform is recommended to be equipped with a draw hook used to fasten the screw coupling system, in accordance with Appendix C of the European Commission Regulation (EU) No 321/2013 concerning the technical specification for interoperability relating to the subsystem 'rolling stock – freight wagons' of the rail system in the European Union /38/. This prevents the wagon from moving during loading. The draw hook must be installed at the centre line of the track at a height of 920-1,045 mm from the top of the rail, as measured from the draw hook centre line. The horizontal of the draw hook must be located 0-20 mm below the horizontal centre line of the buffers of its attached wagon. The design load of the draw hook for a dead-end platform must be a minimum of 15% of the weight of the

heaviest vehicle intended to be loaded to the wagons at any given time, and no less than 100 kN.

Alternatively, the end of the dead-end loading platform may be fitted with an SA3 automatic coupler if it is known that the platform shall be used exclusively by rolling stock equipped with SA3 couplers. The SA3 coupler is placed at the centre line of the track, where the horizontal centre line of the coupler is at a height of  $1,040 \pm 20$  mm from the top of the rail.

The maximum ramp angle of dead-end platforms is 1:12.5.

The loading bridges must be designed for a minimum wheel load of 5 t.

The following construction materials must be used for loading platforms:

- precast concrete platform edge unit + frost-resistant soil + pavement/gravel pavement
- in-situ cast concrete platform edge + frost-resistant soil
- in-situ cast concrete platform
- steel platform constructed over a concrete foundation
- wooden platform
- wooden, steel or concrete platform constructed in connection with a building

The design of loading platforms is dependent on local conditions and their intended purpose.

The platform edge is usually constructed of precast concrete units or in situ concrete.

The surface material must be asphalt, concrete, gravel or wood.

If a side loading platform is situated alongside a dead-end track, the track must be fitted with a fixed or sliding buffer.

### **16.11.3 Special loading platforms**

The loading level of single-deck car-carrier loading platforms must be at a height of 1,210 mm.

Military platforms must be designed and constructed by applying the instructions of this guideline to the specific requirements of the military (in terms of dimensions and loads) on a case-by-case basis in cooperation with the Finnish Transport Agency.

#### **16.11.3.1 Two-deck car-carrier wagon loading platforms**

In general, the platforms used to load vehicles onto two-deck car-carrier wagons shall be dead-end platforms. The loading platform shall permit vehicles to be driven on both the upper and lower decks via loading bridges. Access ramps must have a minimum width of 3.0 m and a gradient of 6–10%.

In the case of electric railways, the upper deck of a car-carrier loading platform must be fitted with lockable gates that prevent access to the wagons while the overhead contact line is energised. The placement of the gate is determined according to the location of the end of the overhead contact line, and must ensure sufficient safety distances to energised parts of the track. The operation of the gate is connected to

the state of electric current in the contact line. The gate must be fitted with protective earthing.

On the loading platforms for two-deck car-carriers, the lower deck must be at a height of 1,140 mm from the top of the rail and the upper level at a height of 3,240 mm. The platforms include loading bridges that extend to the edge of the wagon loading space on the lower deck and 100 mm over the edge of the loading space on the upper deck.

The usable height of the lower level of the loading platform and bridge must be at minimum 1,930 mm. The loading bridges must be suitable for wagons with a buffer height of 1,135–1,225 mm and an upper deck height of 3,060–3,175 mm, measured from the top of the rail.

The platforms and their access routes must be designed to permit the simultaneous loading and unloading of both decks of the wagons. The loading ramps must be designed to permit loading with the use of both new and old rolling stock.

#### **16.11.3.2      *Service platforms and corridors***

A service platform or corridor must be constructed at the level of the top of the rail or approximately 100 mm above the top of the rail, in cases where the space between wagons is accessed from the platform.

In cases where the service platform or corridor is used only to access the interior of the train, the recommended solution is a grated steel structure of a height of 550 mm.

In visible areas or cases where the platform must be accessible by vehicle, the service platform must be constructed according to the dimensions of passenger platforms.

## 16.12 Maintenance

### 16.12.1 General

The maintenance of platforms and routes consists of sanitation services, snow removal, slippage prevention, and fault repair and service work for structures and equipment. In addition, maintenance tasks include the inspection of platforms and their related structures and equipment.

Platform areas and structures and routes must be maintained in good condition to ensure the safety of movement.

Maintenance work may not disrupt the detection of signs and markings along obstacle-free routes.

In the event of maintenance work on structures, devices or equipment related to accessibility, the maintenance operator must provide alternative measures to ensure that persons with disabilities and persons with reduced mobility are able to move safely within the station area /39/.

The scope, quality and schedule of platform maintenance work must be determined by a platform-specific service level classification based on aspects such as the number of passengers and the standard of equipment in the station area.

The TURO instructions for railway maintenance safety must be observed during work carried out in platform areas /40/.

### 16.12.2 Sanitation

Platforms and routes must be kept free of excessive litter, sand and leaves.

The slip prevention and snow removal of platform areas, routes, stairs and ramps must ensure that ice and snow do not pose a danger to passengers. Slip prevention must be carried out using gritting that can be removed without causing airborne dust. Gritting is removed after the winter months, depending on the weather conditions. Gritting may not be brushed over the tracks. Salt may not be used for slip prevention on platforms or any other location where it may be carried on the tracks. Slip prevention must take into account that gritting will be removed from the vicinity of the platform edge due to the air vortexes cause by passing trains, particularly those travelling at speeds of over 120 km/h.

The functionality of sewers and drainage channels must be ensured by removing any leaves, sand, litter etc. in and over the channel that may obstruct water flow. The sanitation work must be performed in at least the spring and autumn, and at other times of the year if conditions so require.

Instructions on the maintenance of the station building must be written in such a way as to ensure that signs and markings for obstacle-free routes are not obstructed by carpets or other objects.

**16.12.3 Fault repair and servicing**

The objective of fault repair and service operations must be the continuous maintenance of functionality.

Fault repair and service operations include ensuring the functionality of lighting and the inspection and necessary corrective repair of fixed signs, public address systems, platform displays, platform area stairs, lifts, escalators, fences, shelters and other fixed structures. Such measures should be primarily directed at issues that may pose a danger to passenger or train safety.

In the event that the display devices are out of service, permanent or temporary fixed signs must be used to provide timetable information for passengers /39/.

In the event that the public address system is out of service, timetable information and audible announcements on departing trains must be provided for passengers by maintenance or train personnel /39/.

In the event that the level crossing warning signal is out of service while the track is operational, the level crossing must be guarded /39/.

In the event that a level crossing used to access a platform with a rail service is out of use due to maintenance work, a person must be present in the station area to ensure that passengers are directed to an alternative route/39/.

In the event that a lift used to access a platform with rail service is out of use, a person must be present in the station area to ensure that passengers are directed to an alternative obstacle-free route /39/.

**16.12.4 Inspections**

An inspection and maintenance needs assessment must be carried out for platforms and routes at least once per year. During the inspection and assessment, information provided by the maintenance personnel must be taken into account.

The inspection must cover the following items:

- cleanliness of the platform areas and routes
- condition of surface structures, cracks, frost damage, vegetation
- condition of platform structures, depressions and inclination
- condition and dislocation of platform edge and danger area markings
- condition of obstacle-free routes
- condition of stairs and handrails
- functionality of drainage systems
- functionality of lifts and escalators
- condition and functionality of guidance
- condition and dislocation of protective fences
- condition of signs and markings
- condition of equipment and furniture
- lighting in the station area

The tolerance values for maintenance work on platform edges are presented in table 16.12:1, maintenance threshold values. If the threshold values for maintenance measures on platforms are exceeded, further actions must be agreed with Finnish Transport Agency immediately.

*Table 16.12:1 Platform maintenance threshold values.*

Platform	Horizontal and vertical plane	Nominal value [mm]	Tolerance [mm]	
Passenger platform	Distance from centre line of a straight track	1,800	+50	−0
	Height from top of the rail	550	+30	−50
Low passenger platform	Distance from centre line of a straight track	1,600	+40	−10
	Height from top of the rail	265	+30	−50
Loading platform	Distance from centre line of a straight track	1,920	+80	−60
	Height from top of the rail	1,200	+50	−50

## 16.13 Placing in service

Design and construction processes on the European Union rail network require an assessment of conformity by the notified body in cases where Trafi has announced the need for an authorisation for placing in service for said change, improvement or new construction and the project must conform with regulations, such as the technical specifications for interoperability (TSIs).

New TSIs and subsequent amendments to existing TSIs do not apply to projects that are reported to have reached an advanced stage of development. The Finnish Transport Agency must be responsible for applying the notification to Trafi. The notification is filed with Trafi in connection with the entry into force of a new TSI.

The project manager is responsible for ensuring that all inspections, verifications and notifications required prior to placing in service are carried out.

Designers and contractors must prepare for the eventuality that the notified bodies may differ in their interpretation of the requirements of TSIs, which may lead to differences in the requirements for technical documentation required for inspections undertaken to verify conformity.

In the case of new construction work on the station area, it is recommended that a hearing be arranged with the parties responsible for the administration of adjoining areas in order to ensure that accessibility requirements are met for both the station area and nearby transport connections, such as tram and bus stops and park-and-ride lots.

The authorisation for placing in service for the station area also typically includes a risk assessment in accordance with the Regulation on common safety methods (CSMs) /41/, which should be attended by designers and contractors.

### **16.13.1 Verification of conformity requirements and measures at the design stage**

Verification of conformity with the TSIs must begin as soon as the design phase of the project has commenced. It is recommended that the design principles of the project be approved by the notified body. The design process should prepare for possible comments by the notified body that may result in alterations to the designs.

The design process must take account of the verification of conformity with various requirements and prepare for the possible need for supplementary designs in order to verify conformity with requirements. The designs and other technical documentation must clearly indicate that conformity has been verified. Designs and other documents necessary for verifying conformity and their different versions must be clear, individualised and easily traceable. The designs and technical documentation must be made easily available for inspection by the client, third party and notified body.

The chief designer is responsible for ensuring that design solutions for various fields of technology are not in conflict with one another. If the project has not been appointed a chief designer, the project manager must be responsible.



It is recommended that construction tolerances be presented in the designs or specifications.

Design tasks related to risk management in accordance with the Regulation on CSMs must be carried out in cooperation with the assessment body, insofar as the measures required for the verification of conformity are the responsibility of the designer.

#### **16.13.2 Verification of conformity requirements and measures at the construction stage**

During construction, the conformity of designs and the compliance of construction with the designs must be ensured.

Before placing in service, the constructor or a contractor appointed by the constructor must arrange an audit of the subsystem for the notified body. In the audit, the notified body shall verify that the construction conforms to requirements and is in compliance with the designs.

During construction, the constructor must be prepared to submit certificates related to materials, conformity reports and certificates, and possible samples to the notified body, to be used for the purpose of verifying conformity.

During construction and prior to placing in service, the constructor and contractor must provide the notified body with the necessary measurement data on matters including the height of the passenger platform and its distance from the track. The notified body may request the use of a certified third-party measurer. If necessary, the measurement method and measurer shall be agreed with the notified body.

In accordance with the Regulation on CSMs, the constructor and contractor must cooperate with the assessment body on issues related to risk management, insofar as the measures required for the verification of conformity are the responsibility of the constructor and contractor.

#### **16.13.3 Authorisation of commissioning and approval**

The Finnish Transport Agency is responsible for applying for authorisation for placing in service from Trafi and the filing of any required documentation.

Trafi issues authorisations for the placing in service of subsystems such as INF and PRM based on certificates of verification and inspection of conformity.

##### **16.13.3.1 Maintenance file and plan**

A maintenance file and plan must be prepared for new stations prior to the stations placing in service. The maintenance plan must aim to ensure that the requirements of INF and PRM TSIs are fulfilled during the entire lifetime of the subsystem /2,5/.

The maintenance file must include all technical documents related to operating conditions and restrictions, and maintenance guidelines and measures.

The maintenance plan must include maintenance measures and threshold values for immediate maintenance action approved by the infrastructure manager.

The requirements for the maintenance of platforms are described in section 16.12.

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