5.5.4. Arrival, Departure & Wayfinding

- **Arrival at and departure from the station**
  The railway station is inevitably only part of a whole journey. In order to get to, and from, the station, some alternative form of transport will have to be used, ranging from walking to air travel. Stations need to make the interchange as easy and safe as possible for passengers. This can be achieved by open station frontages, with safe routes for pedestrians, clear sign posting and shelters for those who have to wait for an alternative form of transport such as a taxi or a bus. These shelters must give passengers a clear view of the arrival of their alternative transport, so that they have confidence that they will not miss it.

- **Safe and easy entry into the station concourse**
  Passengers, including those with visual impairments, need to be able to find the station entrance with ease. Good signage and a clear line of sight from the arrival point will assist, as will marking the entrance clearly, for instance with a contrasting colour.

  The entrance should be level, and the doors should open automatically. Doors should open to at least 800 mm with a recommended width of 900 mm. Automatic doors require a reliable sensor so that they do not close on people who move slowly. A button to delay the door closing mechanism can be provided, to increase passengers' confidence. Revolving doors must be avoided – two sets of double sliding automatic doors with a short distance between can provide equal weather protection. All glass must be clearly manifested for people with visual impairments.

- **Way finding**
  If the station is laid out logically, way finding is immediately easier. No one wants to have to double back

on themselves because they have chosen the wrong route, and for disabled people this can be especially tiring and frustrating.

Photo 5.8 Nässjö Station (Sweden) - good way finding system

Signs should be positioned to be easily read by passengers, including those with visual impairments. Good contrast between the lettering and the background is required.

For people with visual impairments, a guide path (tactile path) on the ground can assist with way finding. It is important to choose the appropriate surface, and if you have a national standard for tactile surfaces you must adhere to it. Guide paths should be designed and laid in consultation with visually impaired organisations, as it is important to provide the right amount of information, and not confuse passengers with too many paths. Guide paths

work well when combined with technological way finding systems.

Technological systems like the system currently in test in Utrecht Central Station in the Netherlands, or the system at Leeds City Station in the United Kingdom, enable visually impaired people to navigate around a station complex on their own. These systems are triggered by smart cards and provide the visually impaired person with spoken information either to a headset, or aloud. They are most useful when combined with a guide path as in Utrecht.

Photo 5.9 Utrecht Overvecht Station (Netherlands) - BOS system

People with cognitive impairments need straightforward directions, clear signage, and a well laid out station. Colour

and guide paths can also be of use to them as they become more familiar with the station.

Way finding from train to station exit must not be overlooked when designing a station. Clear signage, easily visible from the full length of the train, guide paths, colour, and open station design all help to make the journey stress free.

5.5.5. Pre-travel

- **Ticket office design**

  Ticket offices must provide enough space for people queuing, and for disabled people (including wheelchair users and assistance dog users) to move around without feeling they are obstructing the other passengers.

  The queuing system is an important consideration. Some disabled and elderly people find it difficult to stand in line, and will need seating. However, they will want to retain their place in the queue. One solution is to provide a special desk for disabled passengers so that they can purchase their tickets straight away without having to queue. However, this can make some disabled people feel awkward. A better way is to use queue numbers – passengers take a number when they enter the ticket office, and when their number is called, it is their turn to buy a ticket. If such a system is provided, both the ticket issuing machine and the announcement of the number to be served next must be audible *and* visual, so that deaf and visually impaired passengers can use the system.

  The ticket issuing machine must be accessible to wheelchair users, and if it has controls they must be easily used by those with limited manual dexterity. It must always be kept clean for ease of use and, if possible, staff should be available near by.

Counters should be accessible for tall people, and for short people and wheelchair users. In order to achieve this, it is best to use an adjustable ticket counter. The station staff member can lower or raise the counter to suit the passenger purchasing the ticket.

Photo 5.10 Södertälje Station (Sweden) - adjustable ticket counter

It must be possible for disabled passengers to communicate effectively with the ticket sales staff. Induction loops for hearing aid users are a requirement. Open 'face-to-face' counters are best, but where this cannot be done (e.g. for security reasons), non-reflective glass for good visibility, and a sound system that enables people of all heights to speak and listen with understanding should be used.

- **Alternative ticket purchase**
  To assist passengers who find purchasing tickets in the ticket office difficult, or where the ticket office opening

hours are short, it should be possible to purchase tickets in alternative ways.

A useful way of purchasing tickets is the ability to order tickets in writing, by telephone or on the internet, and receive the tickets at home before travel. There are already examples of this system in some European countries. Tickets could also be available from newsagents or other shops, like lottery tickets are.

Ticket vending machines – another alternative to the ticket office – are often difficult for disabled passengers to use. The buttons may be set too high, be too small for those with limited manual dexterity, or be difficult for people with visual impairments to see. Ticket vending machines should be set at a height that enables all passengers to reach the highest and lowest buttons. The buttons must be large enough, and separated enough, for people with limited manual dexterity, and visible to those with visual impairments – e.g. colour contrasted from the machine background, and with large size text, or readily recognised symbols. The addition of speech output will help people with visual impairments and learning difficulties. Touch screens should never be used exclusively for any of the functions – i.e. there should always be an alternative way of selecting as well as touching the screen, so that people who cannot see the screen are not disadvantaged. Ticket vending machines should be positioned so that they can be easily found, but they do not get in the way of passengers. They must be well maintained, so that the features that have been included to provide better access – such as illumination, or sound – do not degenerate. Buying tickets should be a logical, straightforward process, not based on the organisation of the railway, but on the way that passengers think about travel. They should *always* give disabled passengers the ability to use discount cards,

where other discount cards (such as those for elderly passengers) can be used.

5.5.6. Station facilities

- **Waiting**
  Warm, dry, safe waiting facilities should be provided in the station concourse. Plenty of seating must be available, of different heights, and both with and without armrests. Some people find it easier to get up from a seat using the armrests. Access to the waiting facilities must be level, and where the area is enclosed, the doors should open automatically. This will assist all passengers.

  Passengers using the waiting facilities will need information about train departures and arrivals, so that they know when to make their next move. This information should be provided both visually and audibly.

- **Toilets**
  At least one toilet should be accessible to wheelchair users. Some countries, such as the UK, have a national key scheme for accessible toilets, so that they can be locked against vandals. If there is a problem of vandalism this is recommended, but a key must also be readily available on the station from staff situated close to the toilet. The wheelchair accessible toilet should be fitted with the same facilities as other toilets, such as sanitary supply dispensers and condom machines, at an accessible level, and with easy to use controls.

  Other toilets should be fitted with handgrips for people with walking difficulties – including men's urinals.

  Colour contrasting should be used in all toilet facilities to enable visually impaired people to identify facilities without having to use their sense of touch.

In all toilets, facilities such as hand driers, towels, soap and so on must be easy to reach, and easy for those with limited manual dexterity to use.

Toilets must be kept clean and well supplied. Wet floors, lack of soap, dirty toilet seats and surroundings and so on are more of a hazard to disabled people – and will make non-disabled people reluctant to use the facilities provided.

- **Telephones**
  Provision of public telephones is recommended. Wherever these are provided, they should be made accessible to disabled people. The highest feature of telephones that passengers need to reach should not be above 1300mm. Provision of induction couplers and volume controls, pay text telephones, and easy to distinguish and use controls are all important considerations. Where telephones have a canopy to protect users from ambient noise, the canopy should reach to the floor, so that white stick users can recognise it as an obstacle and not bump into it.

- **Trolleys**
  Luggage trolleys are a very important facility for passengers, especially in larger stations. Trolleys should be stable, and easy to manoeuvre with a good braking system. The locking mechanism (to connect a row of trolleys) must be easy to use for people with limited manual dexterity.

  Frequent trolley points are important so that people do not need to walk a distance to return their trolley.

- **Commercial outlets**
  Commercial outlets are usually rented to third parties. However, every effort should be made to ensure that they are accessible to disabled passengers, so that

disabled passengers are given equality of service on the station. Additional facilities are an important part of the station experience – they add value to the service railway companies provide to their customers. Service agreements and lease terms can be used to require access for disabled passengers.

Important things to remember are: identification of the facility – e.g. by inclusion in the wayfinding and guidance systems, counter heights, access to and identification of goods, communication with sales and service staff. In food and drink outlets, at least some loose seating should be provided, so that wheelchair users, assistance dog users, and ambulant disabled people are able to be seated at tables.

- **A 'safe haven'**
  When people get into difficulty on their journey, they need somewhere safe and comfortable to stay whilst they sort out the problems. These problems may arise because they have missed a train, or mistaken information they have been given.

Photo 5.11 Chamartin Station (Spain) - "safe haven"

The 'safe haven' should provide seating, and a means of communication with rail companies or station staff, so that new plans can be made. It can be the same area as the waiting room, if one is provided, or the restaurant or café.

Although these 'safe havens' may be used by all passengers, they are of especial benefit to disabled people because of the forward planning required for their journeys.

5.5.7. Platforms and tracks

• **Design of platforms including safety**

Platforms must be wide enough to allow passengers to stay clear of high speed trains passing through the station (clearly marked by a line on the platform), whilst still providing plenty of circulation space in the safe area. Guidepaths for visually impaired people should always be located in the safe area of the platform. The edge of the platform must be clearly marked with colour contrast. Tactile edging is recommended for marking the platform edge, but only where its meaning is unambiguous - the tactile surfaces should warn passengers specifically that they are at the edge of an off-street platform. Where there are national standards, they should always be adhered to.

Obstacles on the platform should be avoided, and where this is not possible (such as lighting columns and train driver information panels), they must be clearly contrasted with their background so that they do not provide a hazard to visually impaired people. Furthermore, obstacles must not stick out further towards the top than at the bottom, as a white stick user may not detect the obstacle until they hit it.

- ## Getting from one platform to another

  Except where a station is a small halt with only one platform, getting from one platform to another will be essential for travel. Footbridges enable passengers to orient themselves more easily than they are able to when going under the tracks via a tunnel. They are able to see the tracks, and to get a good view of the station environment, and are liable not to become confused about directions. Both footbridges and subways require glass lifts (ramped footbridges generally require too long a ramp), and safe well designed stairs. In larger stations, escalators can be provided as an additional choice for passengers.
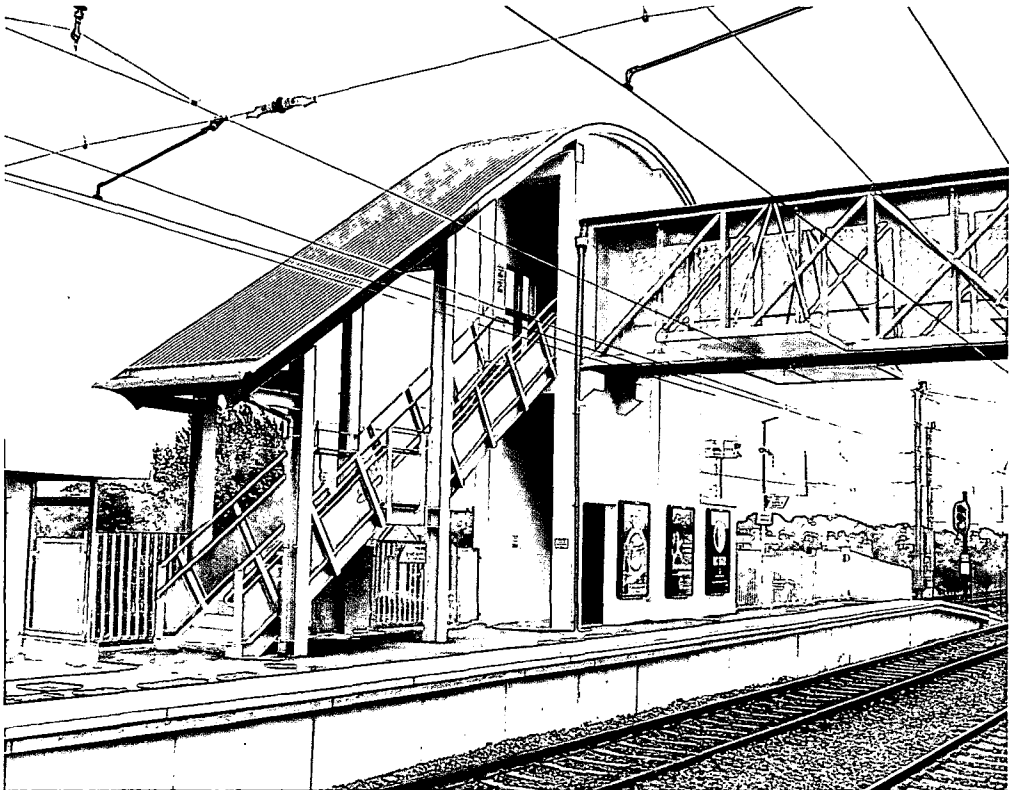

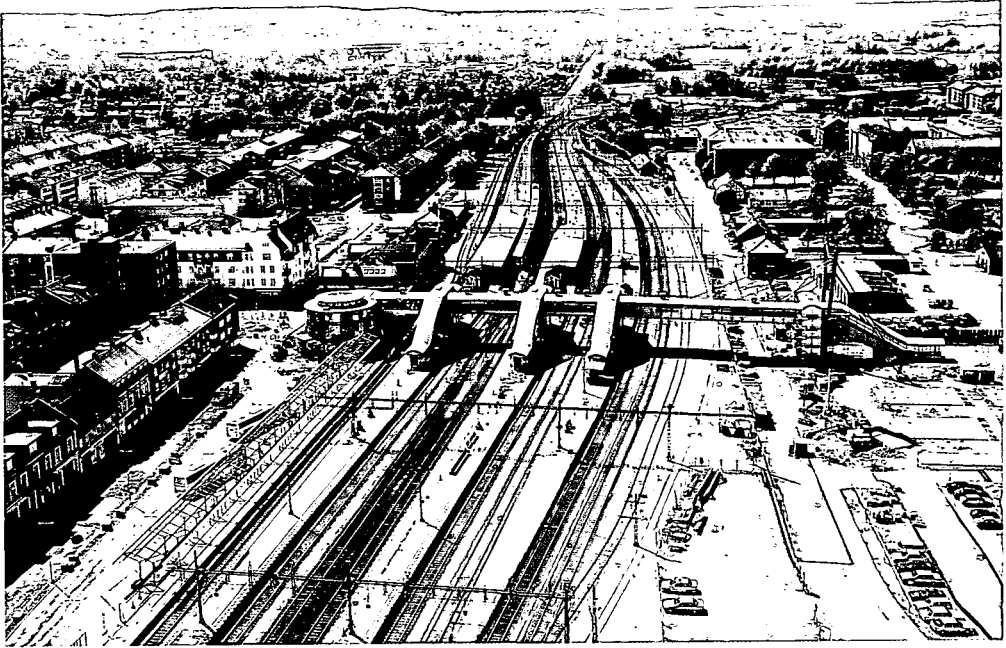Photo 5.12 Clontarf Road Station (Ireland) - foot bridge
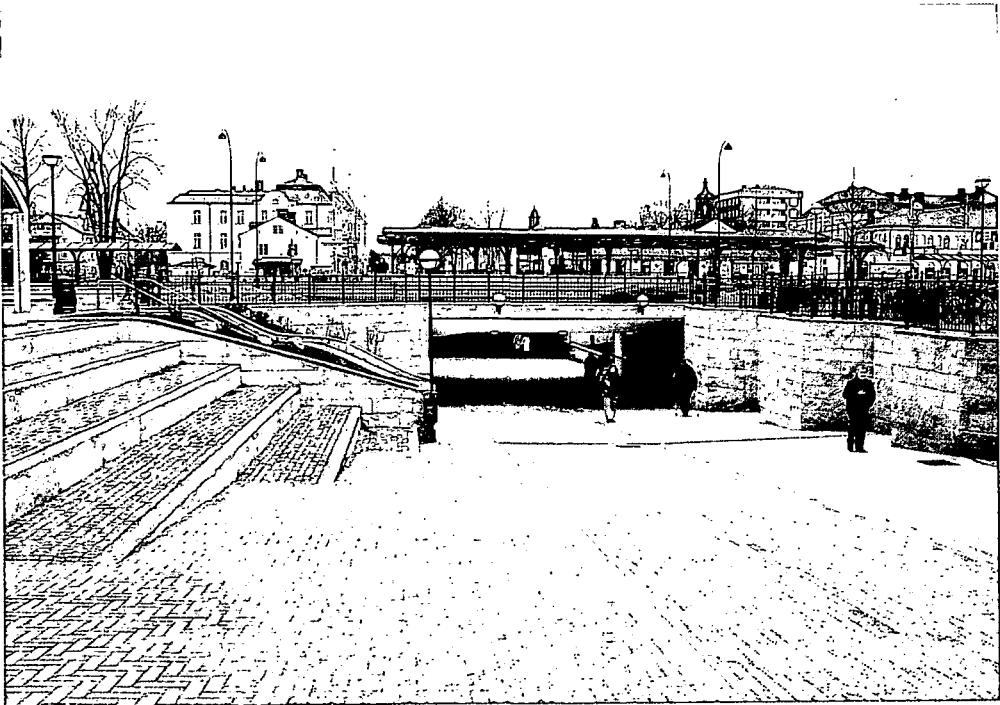
Photo 5.13 Hässleholm Reissecenter (Sweden)

Photo 5.14 Katrineholm Station (Sweden) - tunnel

Photo 5.15 Angleholm Station (Sweden) - level crossing

Crossing the tracks themselves may be acceptable in some circumstances - e.g. where the trains are less frequent and do not travel at high speed. In this case, care must be taken to ensure that the gaps in the rails, for the train wheels, do not cause an obstacle for those in wheelchairs, or with sticks and crutches. If the crossing is not a controlled level crossing (for example, a barrow crossing not primarily intended for passenger use), disabled passengers must be accompanied when crossing.

• **Waiting on platforms**

No matter how punctual the trains are, and how good the information provided in the station concourse, some passengers will inevitably have, or choose, to wait on the platform. Disabled people are likely to wait on the

platform longer than other passengers because they will be less confident of getting to the train on time.

It is important to provide plenty of seating, of different heights, and both with and without armrests. Some people find it easier to get up from a seat using the armrests.

Photo 5.16 Ermelo Station (Netherlands) - waiting shelter

Good shelters are also required, and where possible and necessary, these should be enclosed and heated. The shelters must have level entrance, and automatic doors, to enable easy access. Modern shelters are often constructed of stainless steel and glass, but this causes significant problems for people with visual impairments, and as a minimum, stainless steel should be coated with colour, and glass should be clearly manifested. A range of seating should be provided in the shelter as on the platform. Shelters must be large enough to provide a turning circle of at least 1500 mm for wheelchair users.

Disabled passengers using the waiting facilities will need information about train departures and arrivals, so that they know when to make their next move. This information should be provided both visually and audibly.

- **Access to trains**
  The interface between platform and train is covered in chapter 4.

5.6. Sound and acoustics

5.6.1. Environment

Where passengers need to be able to hear staff speaking to them – for example at ticket office counters, information booths and so on, it is important that the surrounding area is quiet. These facilities should not be located where the noise of trains or traffic or of station announcements makes a disturbance.
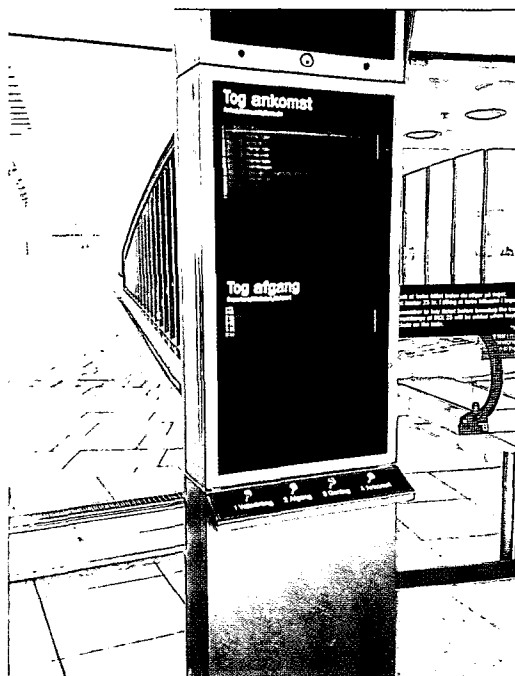

Photo 5.17 Kastrup Station (Denmark) - talking information sign

5.6.2. Operational practices

Audible messages are provided so that passengers can be given information about their train journey – whether regular information or information about exceptions such as delays or cancellations. Railways often forget the purpose of these messages, and they may not even be of use to non-disabled passengers if they are not properly provided.

Staff who make announcements must be trained in the correct use of the equipment, such as microphones. Incorrect use of equipment is the most common reason for failure to communicate adequately. They should be encouraged to speak clearly, and not to speak too fast – very slow speech can, however, be equally difficult to understand. Announcements must be correctly timed – it is pointless announcing the train at platform 3 if it has already left the station.

Staff need to understand that if an announcement is worth making at all, it is worth ensuring that all passengers can understand it. But of particular importance are those announcements about exceptions to the norm at the station, such as platform changes.

5.6.3. Technology

The loudspeaker system should transmit the spoken messages faithfully. Clarity of sound depends on the choice of loudspeaker system, the placing of the loudspeakers, and the loudness of the audio signals. For the system to function satisfactorily the loudspeaker system should give an even spread of sound; there should not be points or areas where the sound is uncomfortably loud, or too soft to be heard clearly. As the main function of the loudspeaker system is to transmit spoken messages, the reproduction of consonants is of particular importance. The complexity of

combining the problems of acoustic conditions with loudspeaker technology requires use of consultants if the result is to be effective.

5.7. Emergencies

Any plans for emergencies must consider the needs of disabled passengers. In emergencies, many disabled passengers will be less able to fend for themselves. If their evacuation has not been properly planned, they may become a danger to themselves and to other passengers. Good planning can avoid such a disaster.

People who are deaf, or hard of hearing, need to understand that there is an emergency, what the emergency is, and what they should do. Visual information and the use of flashing lights can assist.

People who are visually impaired may be able to hear the warnings, but may not know where they should go, and may become disorientated. Emergency routes and exits should be well marked with colour and light, and assistance should be provided to those who are unable to use these cues.

People with mobility impairments will need time to evacuate and, in many cases, assistance. Refuges may be needed so that they can wait for assistance – these should be clearly identified, and have a communication system available so that the passengers can alert someone that they are there, and be reassured that help is coming. Lifts, escalators and travelators need to complete their journey, and will need a backup power source in case of power failure.
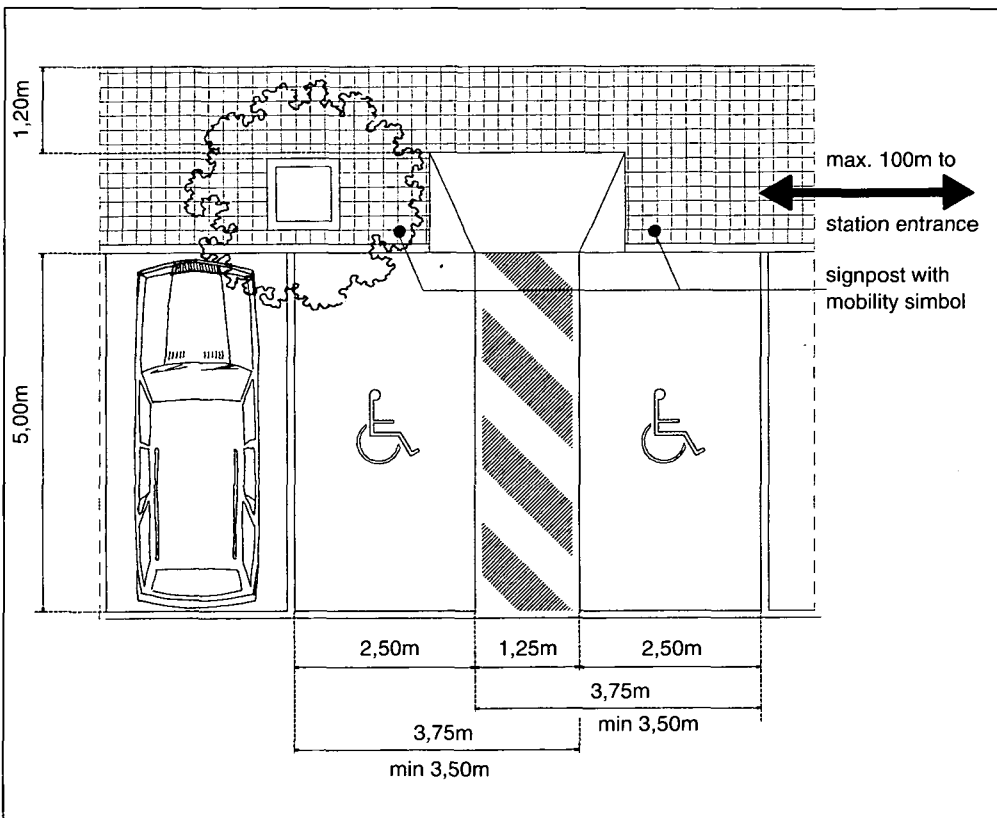
5.8. Dahl charts

Parking - location and type

Purpose
To ensure that passengers using private cars to access the station can leave their cars safely
To ensure that passengers with reduced mobility are able to park close to the station entrance

Best: Full range of parking options - short-stay, long-stay, drop-off, pick-up
All options available for people with reduced mobility within 50m of station entrance

Parking space at least 3.75m wide
Parking for people with reduced mobility
clearly reserved (blue space)
Fines for people parking illegally in
reserved spaces
Free parking for all options
Security patrols in the car parks
Well-lit parking areas
Shelter to allow people to transfer in
comfort

Recommended:
standard:
Full range of parking options - short / long-
stay, drop-off, pick-up
Parking space at least 3.75m wide
Parking for people with reduced mobility
clearly reserved (blue space)
Fines for people parking illegally in
reserved spaces
Reasonable parking costs for people with
reduced mobility
A working security system in the car parks
that will monitor reserved spaces
Well-lit parking areas

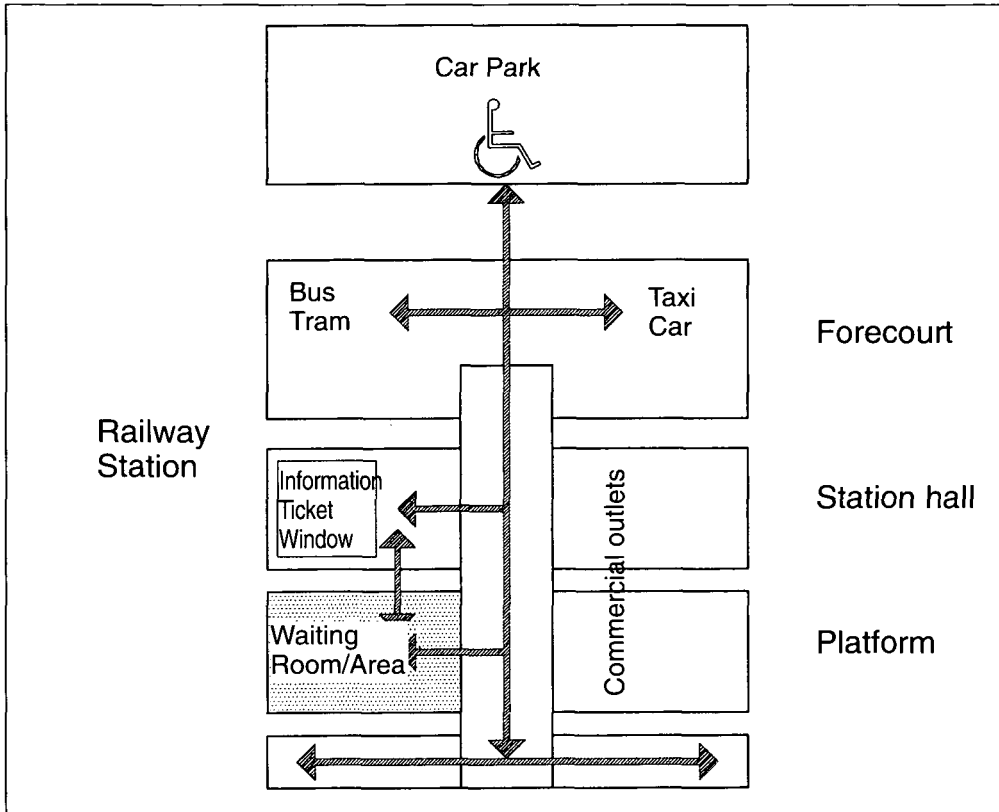**Minimum:**
Full range of parking options - short / long-
stay, drop-off, pick-up
Parking space at least 3.75m wide
Parking for people with reduced mobility
clearly reserved
Fines for people parking illegally in
reserved spaces
Well-lit parking area

Routeing systems

Purpose

To give guidance regarding the main layout of the station.

Logical layout
- Main functions located in a logical step-by-step progression
- Secondary functions clearly separated from but located adjacent to main functions
- Having goals in sight enables passengers to understand the route quickly and easily - main facilities clearly visible
  - from main entry
  - from platform end
  - at all stages through the building

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Circulation system

- All passengers should follow the same route, as a matter of principle
- Functions/facilities located adjacent to, not intruding into main circulation space
- For passengers to maintain a sense of direction, the route should follow a straight line through a clearly defined space.
- Changes of direction should be avoided wherever possible.
- A succession of bends, or bends at angles other than 90 degrees contribute to loss of direction and should be avoided.

Guidepaths on Platforms

Purpose
To direct visually impaired passengers along the platform to their boarding point, in the safe area

stairs

■ Other (tactile) Marking

☐ Guidepath
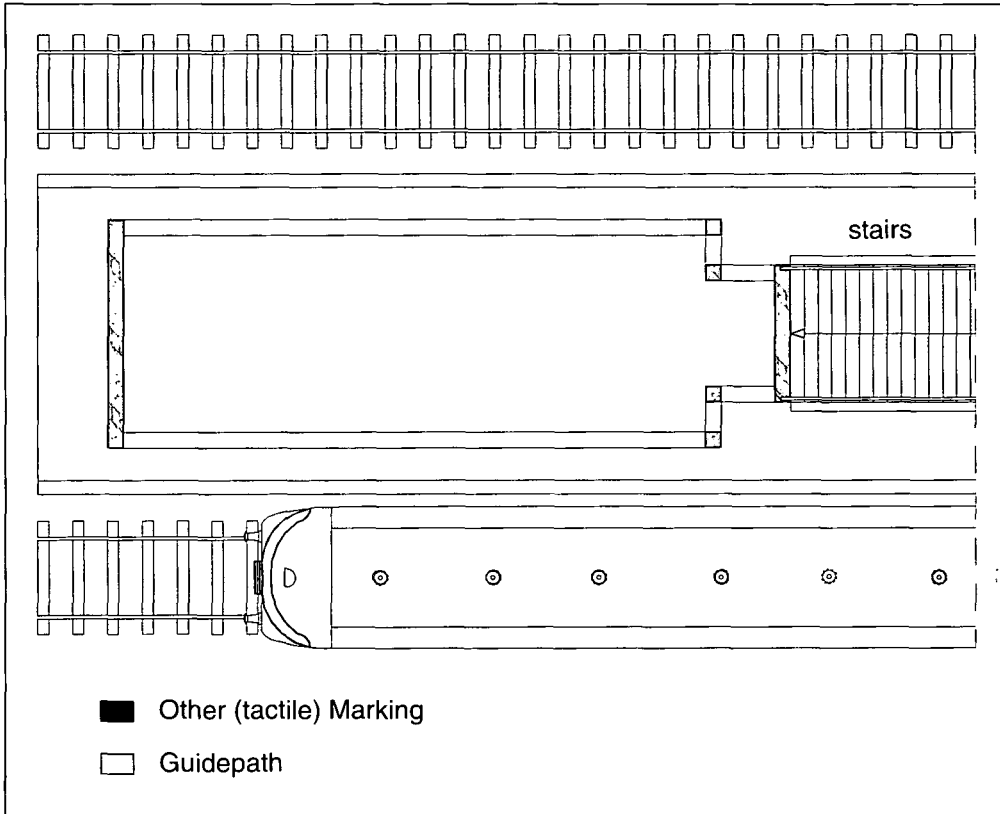
Best: 800 mm wide
On the safe side of the platform safety area (see Platform chart)
Rubber or concrete tiles (see Tactile Flooring chart for type)
Lighting 100 lux

Recommended: 600-800 mm wide
standard: On the safe side of the platform safety area (see Platform chart)
Rubber or concrete tiles (see Tactile Flooring chart for type)
Lighting 50 lux

Minimum: 400 mm wide
On the safe side of the platform safety area (see Platform chart)
Rubber or concrete tiles (see Tactile Flooring chart for type)
Lighting 20 lux

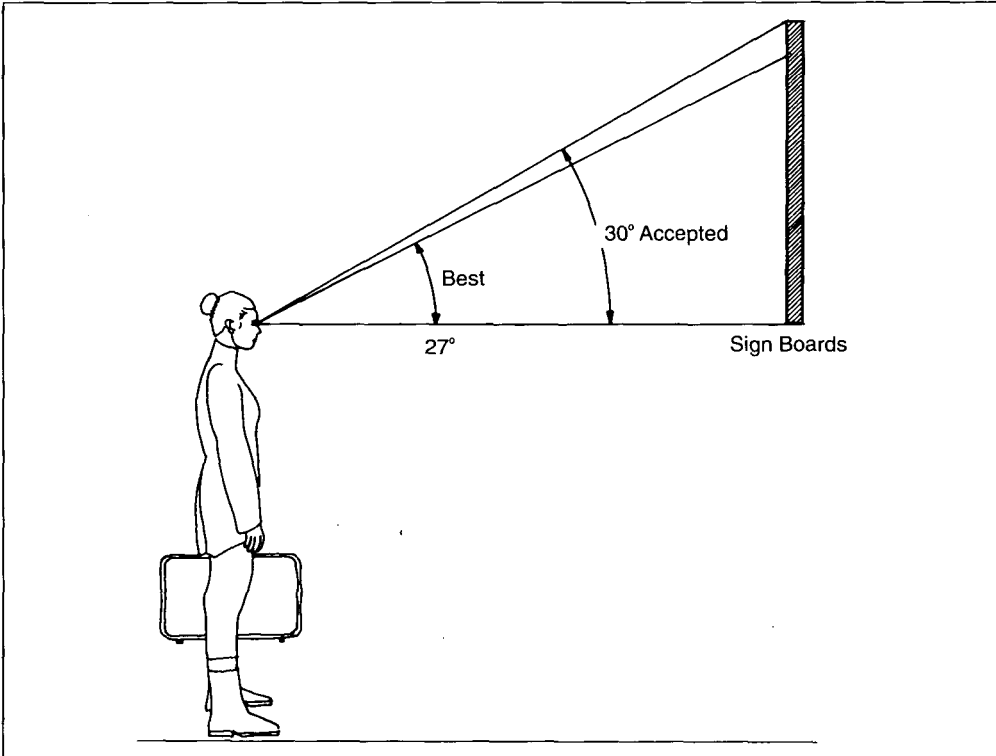# Sign Boards

Purpose

To enable all passengers to read signs easily, to get information and to find their way

30° Accepted

Best

27°　　　　　　　　　　　　Sign Boards

Best:　　　　Sans serif font, mixed case, letters evenly spaced
Lighting indirect
Contrasting colours as indicated
Angle of elevation $< 15^{\circ}$

$$\text{Height of lettering} = \frac{\text{reading distance}}{250\text{mm}}$$

Matt surface with maximum 15% gloss factor

Recommended standard: Sans serif font, mixed case, letters evenly spaced
Lighting from the back or side
Contrasting colours as indicated
Angle of elevation $< 25^\circ$
Height of lettering $= \dfrac{\text{reading distance}}{\text{250-300mm}}$
Maximum 40% gloss factor

Reading distance (mm)	5000	4000	3000	2000	1000
Best letter height (mm)	200	160	120	80	40
Acceptable letter height (mm)	170	130	100	70	40

Tactile signs should be used where possible to support visual signs, but must always be within reach (800-1300 mm), and never disrupt passenger flow
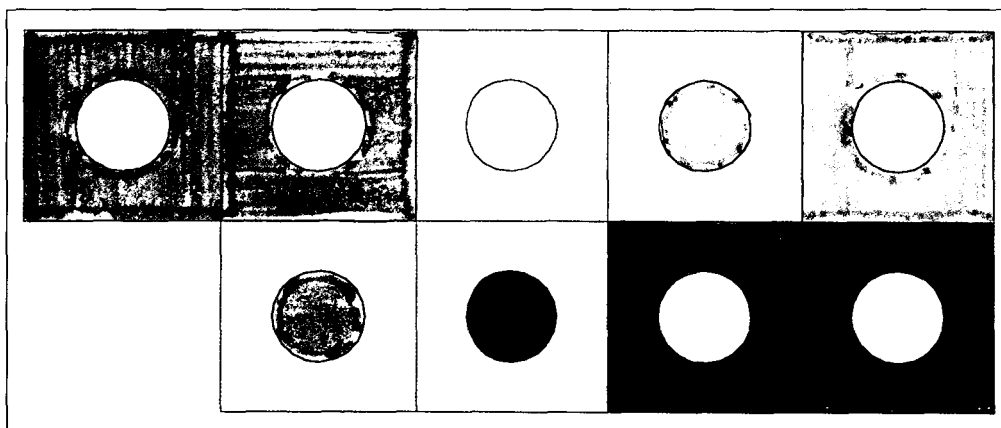
Timetable panels

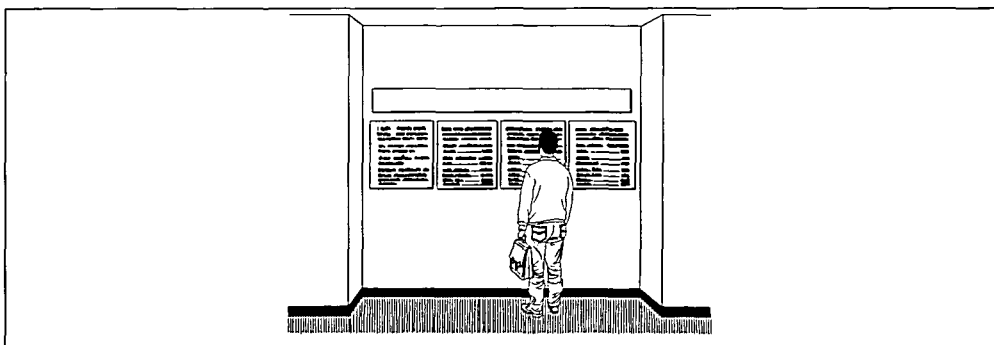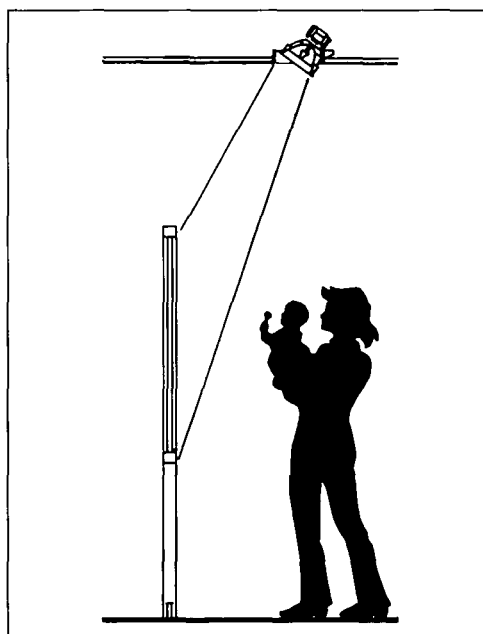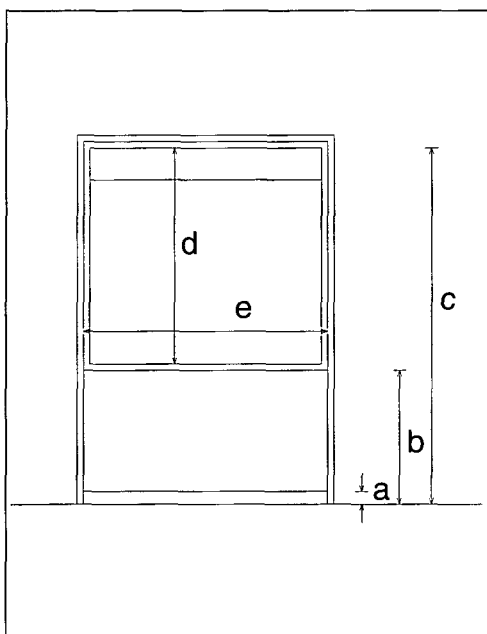| *Purpose* |
|---|
| **To provide easily legible and understandable information for passengers.** |
| **To provide information without blocking the main passenger flow (either the boards themselves, or those reading them)** |
| **To be clearly visible without causing an obstacle to disabled passengers, especially those with visual impairments.** |

Placing of panels

Panels should be positioned adjacent to the main flow of passenger circulation, and at right angles to the direction of the flow.

Placing should allow travellers to stand directly in front of the panel (reading distance less than 0.5 m) without impeding the main circulation flow.

Protection

Free standing panels should be clearly marked in accordance with the chart "Protection from obstacles".

Panel frame

a. Skirting*:Minimum and best 300-400 mm

b. Underside of panel/free space underneath panel: Best 900 mm Minimum 700 mm

c. Top of panel: Best 2.1 m Maximum 2.6 m

Panel size, standards

d. Height 1.0 – 1.2 m
e. Width 800 mm – 1.1 m

Lettering

- Colour and contrast: see chart "Sign Boards"
- Text: Mixed case, Best 30 mm Minimum 25 mm
- Heading: Capital letters, Best 150 mm Minimum 50 mm

* Note. Free standing panels with an opening between the paving and the underside of the panel should have a skirting to guide visually disabled who use a touch stick around the panel.

Radio / Electronic Aids

Purpose
To assist visually impaired passengers to find their way around the station
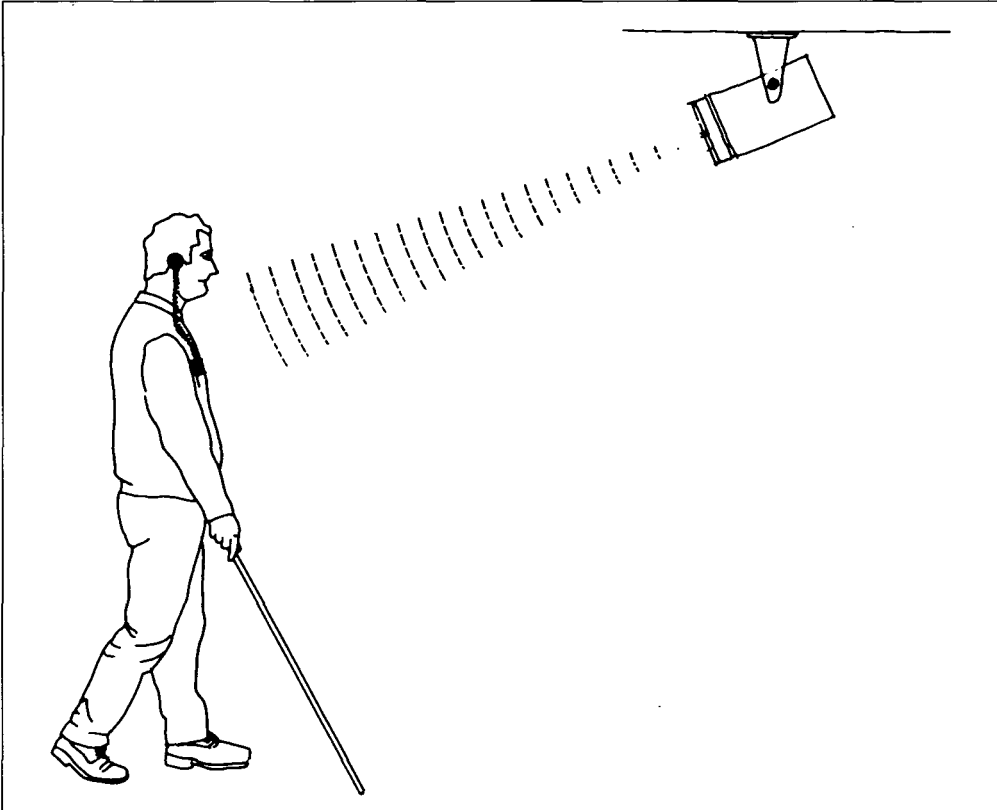
For passengers with a visual impairment, advanced guidance systems have been developed – sometimes known as 'smart signs'. These systems are beacons that are controlled remotely by a receiver which the visually impaired person wears or holds, and provide information at critical points on the route.

There are two types of system – infra-red and radio frequency. Infra-red (BOS, Easywalker, Open, Infravoice and Talking signs) is line of sight only, and radio (RNIB React, Czech Blind United, pe, RIS) is non-directional.

Best: Static information (about unchanging features of the environment)
Route information in conjunction with a guidepath (see chart)
Dynamic information (about train departures, platforms etc.)

Recommended standard: Static information (about unchanging features of the environment)
Route information in conjunction with a guidepath (see chart)

Minimum: Static information (about unchanging features of the environment)

Commercial Outlets

Purpose
To ensure that the station gives better value to the community by providing services other than just transport whilst:
Enabling all passengers to find their way around the station more easily and
Providing better access for disabled people at commercial outlets on a station – such as catering, kiosks and retail outlets

Railway Station:

Bus Tram		Taxi Car
Commercial Outlet		Commercial Outlet	Forecourt

Ticket Window

Commercial Outlet | Station hall

Commercial Outlet | Platform

Commercial Outlet | Platform

Commercial Outlet | Platform
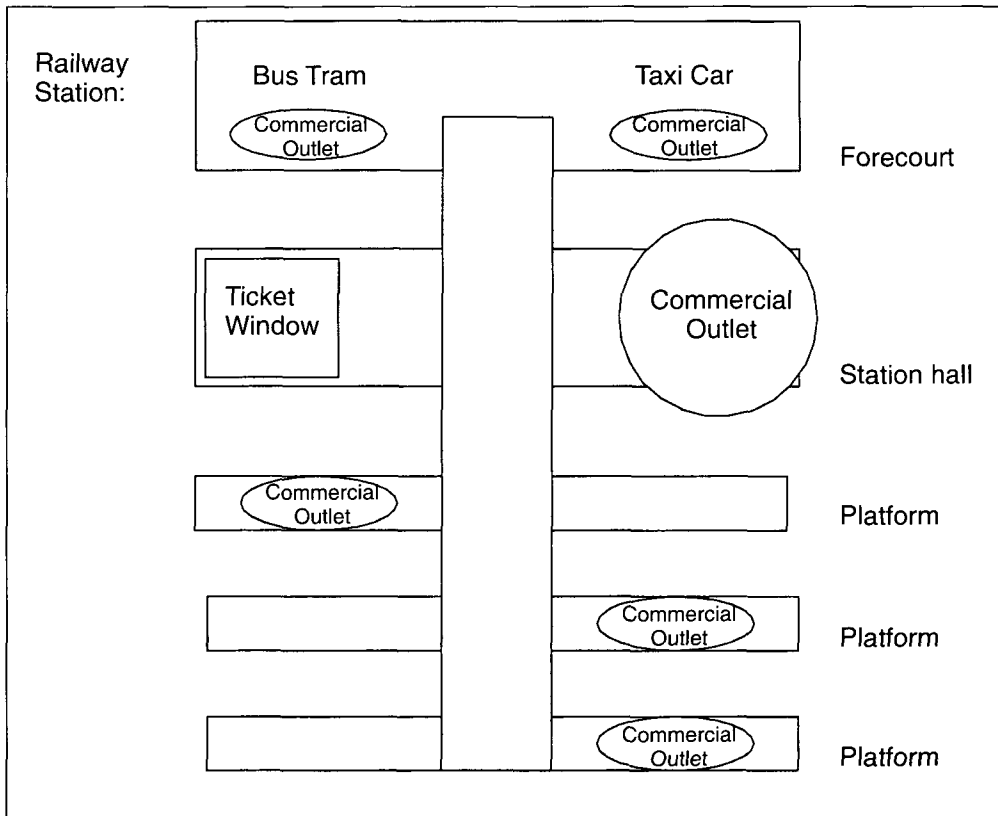
Best: Grouping of commercial facilities around a given theme – e.g. catering, pharmacies, bookstores

Clear signage and text with directional arrows, pictograms, and colour-contrasted routes for visually impaired people and those with learning difficulties – with electronic orientation system

Wide passageways and step-free access

All interiors fitted with accessible furniture, tables, chairs etc.

Adjustable counters with leg room under for wheelchair users

Automatic glass doors, with markings for visually impaired people.

Recommended standard: Clear signage and text with directional arrows, pictograms, and colour-contrasted routes for visually impaired people and those with learning difficulties – with electronic orientation system

Wide passageways and step-free access

All interiors fitted with accessible furniture, tables, chairs, adapted counters etc.

Automatic glass doors, with markings for visually impaired people.

Minimum: Clear signage and text with directional arrows, pictograms, and colour-contrasted routes for visually impaired people and those with learning difficulties – with electronic orientation system

Wide passageways and step-free access

Automatic glass doors, with markings for visually impaired people

Walking distances

Purpose
This chart outlines limits to the length of travel on foot; distance is one of the primary disabling features. (See also note 1 below)

Car Park

Bus
Tram

b

Taxi
Car

Forecourt

Railway
Station

a

Ticket
Window

Station hall
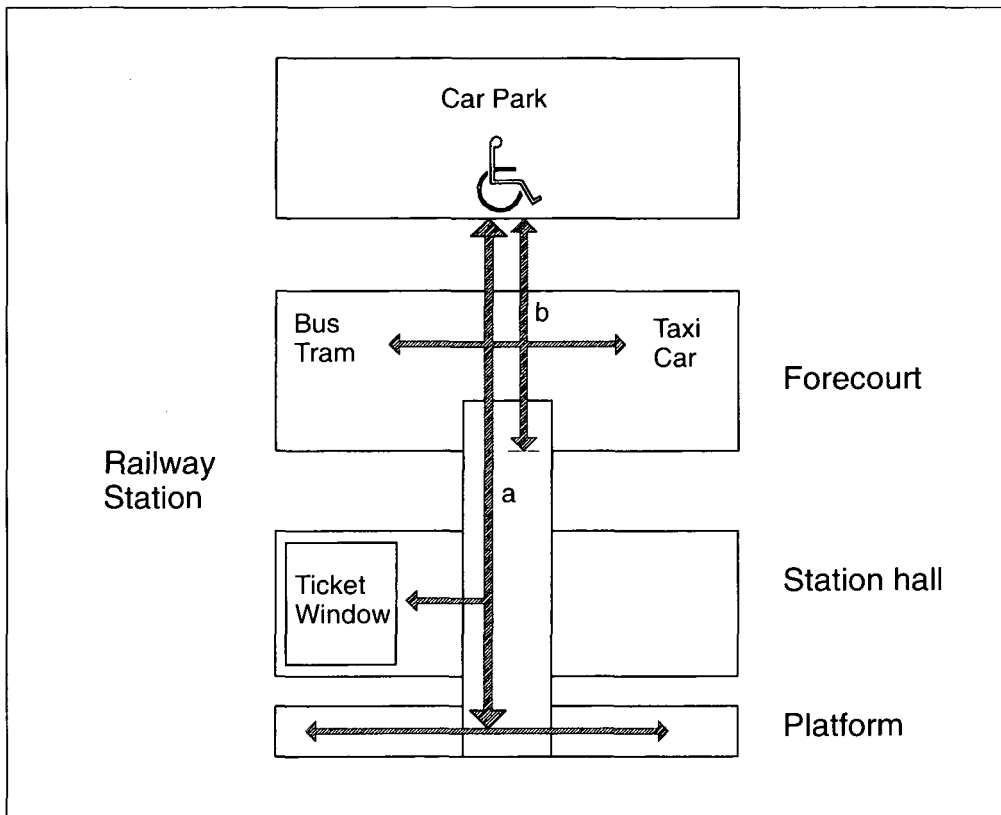
Platform

a. Total distance from accessible car park to the start of the platform closest to the entrance
Best: 100 m. Maximum: 200 m.

b. Distance from accessible car park to station entrance or platform
Best: 50 m. Maximum: 100 m.

c. Ticket facility
   Should be situated on the main circulation route through the building

Notes:

1. Objectives

The figures should be understood as statement of aims and goals; the conditions in many existing structures may make it impossible to satisfy the requirements. The aim should always be to arrive at solutions that are as close to the maximum (or best) requirements as possible.

2. Supplementary dimensions

It is advisable to supplement the requirements with best/maximum distances to other facilities, such as toilet, left luggage etc.

3. Assistance/personal transport

Personal transport such as electric mini cars is an efficient way of minimising barriers between the entrance and the train for all passengers. The provision of personal transport is particularly advisable in large stations, where the size and layout make it impossible to achieve the recommendations in the table.

4. Route distance information

Where walking distances cannot be reduced, it is important to provide people with

a) information about the distance, number of steps if any, and suggestions for the 'shortest route'
b) seating and resting places close beside the route

Stairs

Purpose

To ensure that passengers who prefer to use stairs can do so safely and with ease

Steps with risers, grab rails at two levels and tactile surfacing in a different colour to mark the top and bottom of the steps

800-900mm
300-500mm
600-700mm

1000mm

min 290mm
300-500mm
max 170mm
800-900mm
600-700mm

c.a. 5mm
c.a. 5mm
max 30mm
1000mm

Risers

Steps equipped with risers. The nosings are accentuated by giving them a different colour.
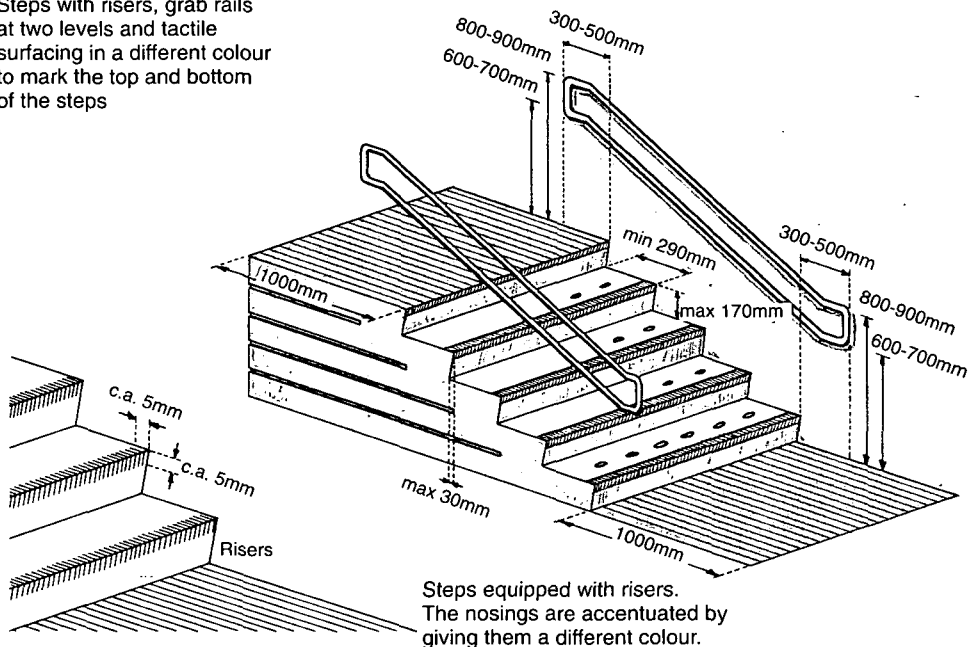
Best: Straight flight(s); Each flight >3 and <12 steps with landings
Closed risers, height 100-120mm, 1 tread + 2 risers = 620mm
90° angle between tread and riser;
Width of stair 1.2m to 1.5m between handrails
Colour contrasted hazard warning at top/bottom of flights (>= 1m width)
Treads with contrasting nosings (on tread and riser) and non-slip surface
Good lighting on stairs (see lighting chart)
Closed underside of stairs
Handrails (see handrail chart)

Recommended standard: Straight flight(s); Each flight >3 and <12 steps with landings
Closed risers, height 100-120mm, 590mm<1 tread+2 risers>650mm
90º angle between tread and riser;
Width of stair 1.2m to 1.5m between handrails
Colour contrasted hazard warning at top/bottom of flights (>= 1m width)
Treads with contrasting nosings (on tread and riser) and non-slip surface
Good lighting on stairs (see lighting chart)
Closed underside of stairs
Handrails (see handrail chart)

Minimum: Riser height not > 170mm; Landings at direction changes
Closed risers unless a passenger operated lift is available
590mm < 1 tread + 2 risers > 650mm
90º angle between tread and riser;
Width of stair >=1m between handrails
Hazard warning at top and bottom of flights (>=1m width)
Treads with contrasting nosings (on tread and riser) and non-slip surface
Good lighting on stairs (see lighting chart)
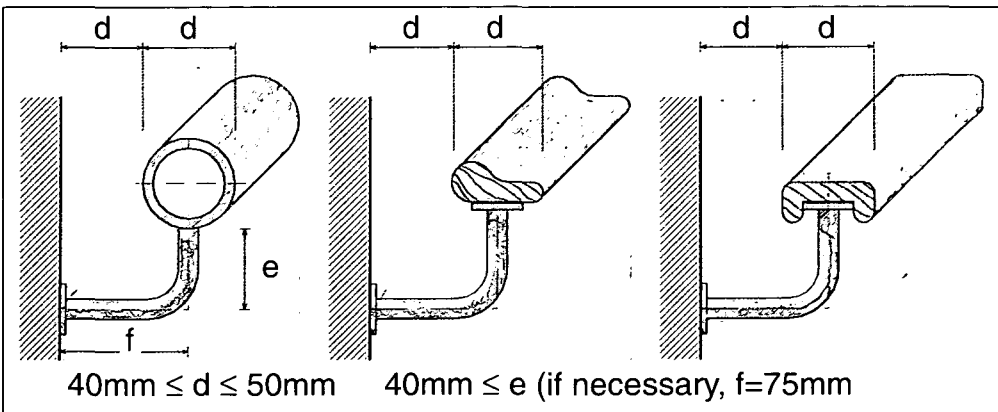Open underside of stairs must be clearly marked
Handrails (see handrail chart)

Handrails

Purpose

To give passengers a safe, easy to hold, support when using stairs, ramps and other walkways

$h = 900mm$
$hn = 900mm$ $\left.\right\} \pm 50mm$
$hd = 700mm$

$300mm \leq c \leq 600mm$ Best 500mm

$40mm \leq d \leq 50mm$ $40mm \leq e$ (if necessary, f=75mm)

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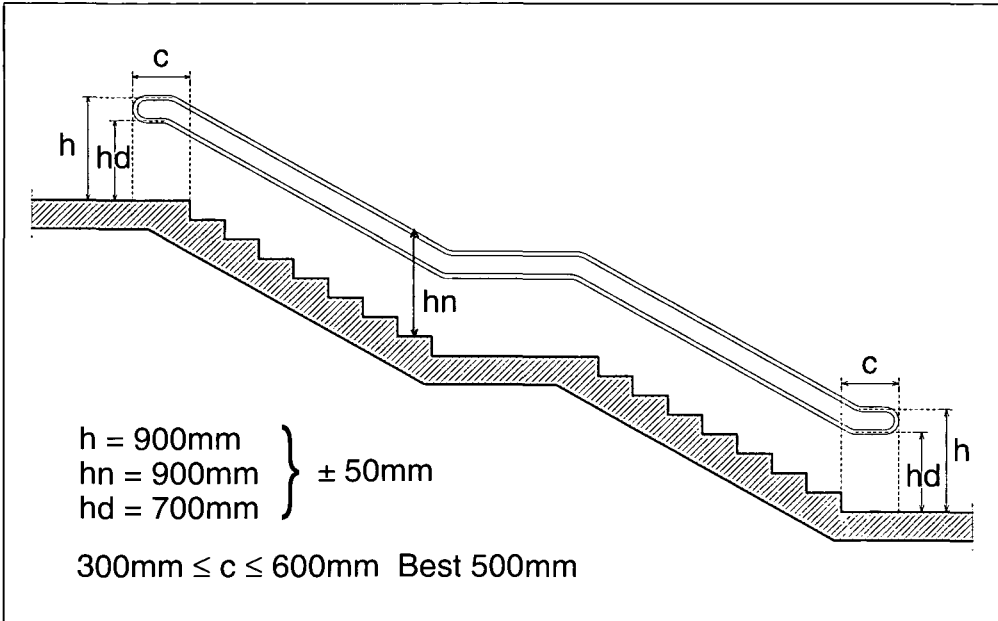
Best: Handrail at 900mm
Lower handrail at 700mm for children and short people
Handrail extends 500mm beyond top and bottom stair
Material colour contrasted, rust-free, warm to touch, not containing nickel, rubber or chromium
Handrail diameter between 40mm and 50mm
Distance from wall between 40mm and 50mm

Recommended standard: Handrail between 850mm and 950mm
Lower handrail between 650mm and 750mm for children and short people
Handrail extends between 300mm and 600mm beyond top and bottom stair
Material colour contrasted, rust-free, warm or neutral to touch, not containing nickel, rubber or chromium
Handrail diameter between 40mm and 50mm
Distance from wall between 40mm and 50mm

Travelators

Purpose

To provide passengers with a route from one part of the station to another without having to walk far
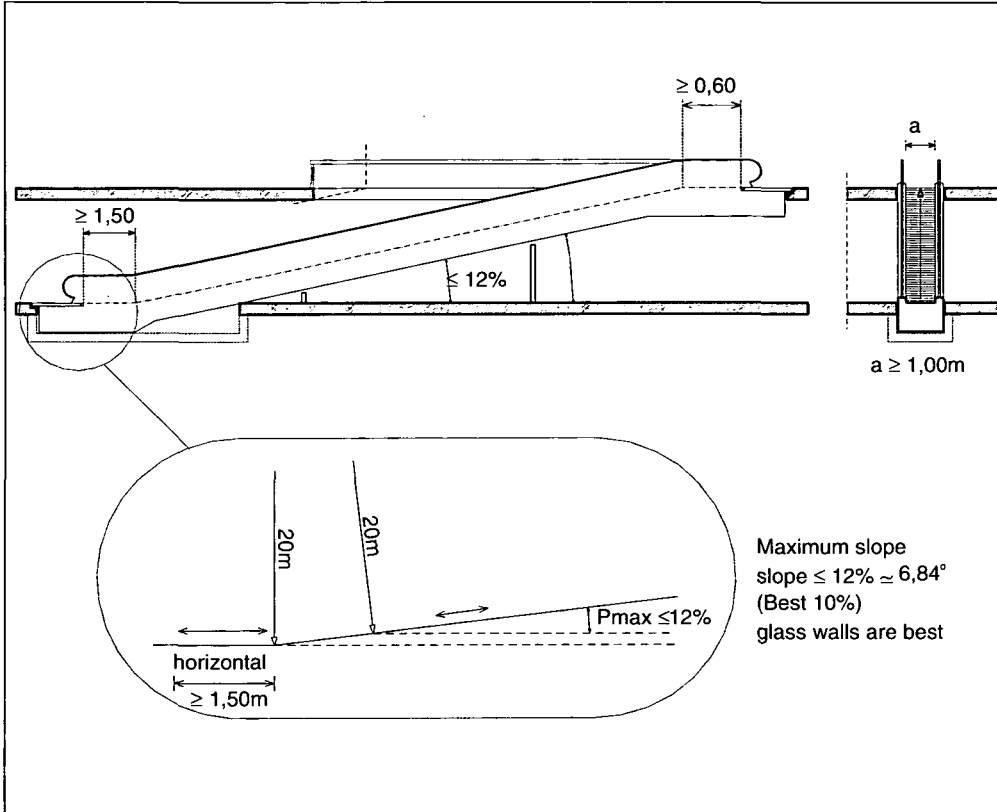
Best: Width >= 1.5m
Level travel
Speed <= 0.75 m/s
Handrail available (see handrail chart)
Handrail and travelator
Slip-resistant flooring
2.3m height clearance along the length

Recommended standard: Width >= 1m
Gradient <= 10%
Speed <= 0.5 m/s

Handrail available
Handrail and travelator move at same speed
900mm slip resistant flooring at start and finish

If used outside, requires cover and other weather protection if applicable.

Steps must always be available in addition to a travelator.

Lifts

Purpose
To provide additional means of changing level for those unable to use stairs or escalators
Must always be available when there are different floor levels in the station

When stopping, looseness should be 2cm or less

≥ 110

≥ 140
100 Lux

≥ 85

≥ 50

Ø 85

≤ 2cm

lift car

≥ 110

≥ 140

40   ≥ 210

3,5

Height 90

1000-1300

900-1200

30

Protection plinth

≥ 85 min.
best 1000

Perimeter round section handrail 3cm ≤ Ø ≤ 5cm
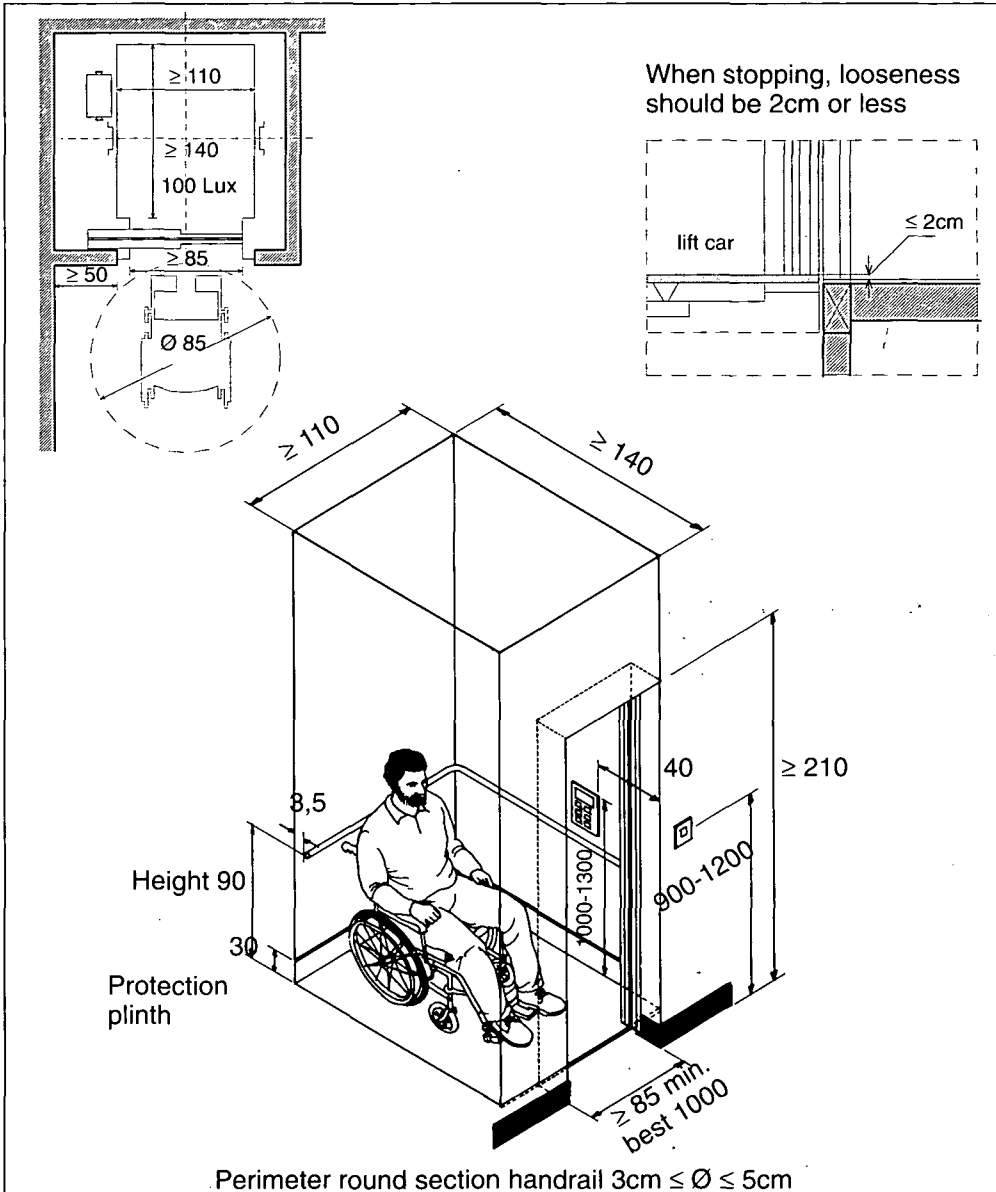
Best: Located immediately next to the stairs
Non-reflective glazed shaft and car for
visibility in and out
Automatic entry doors, with sensor
preventing doors closing on passengers,
baggage etc. − doors to remain open > 20
seconds for slowest passengers
Doors block open when lift not in
operation
Slip resistant flooring
Handrail around lift car (see handrail
chart)
Visual indicators of floor level and facility
Acoustic information for floor level, doors
closing and opening
Visual information opposite lift door
indicating floor level
Weight capacity >650kg
Emergency intercom system with
induction loop
Contrasting colour door
For controls, see lift control chart

Recommended standard: Clearly signed from and close to the stairs
Non-reflective glazed panels
Automatic entry doors, with sensor
preventing doors closing on passengers,
baggage etc.
Slip resistant flooring
Handrail around lift car (see handrail
chart)
Visual indicators of floor level and facility
Emergency telephone
Visual information opposite lift door
indicating floor level
Weight capacity >650kg
Contrasting colour door
For controls, see lift control chart

Open lifts

Purpose

To give a means of changing level to those unable to use steps that is cost-effective where the level change is <= 1m

250kg Min Minimum 850
V ≤ 0,1m/s Best 1000mm

900

1500

(Plan)

The lift has no ceiling
it is open

○ ○ ○

1115

UP

DOWN

(cross section)
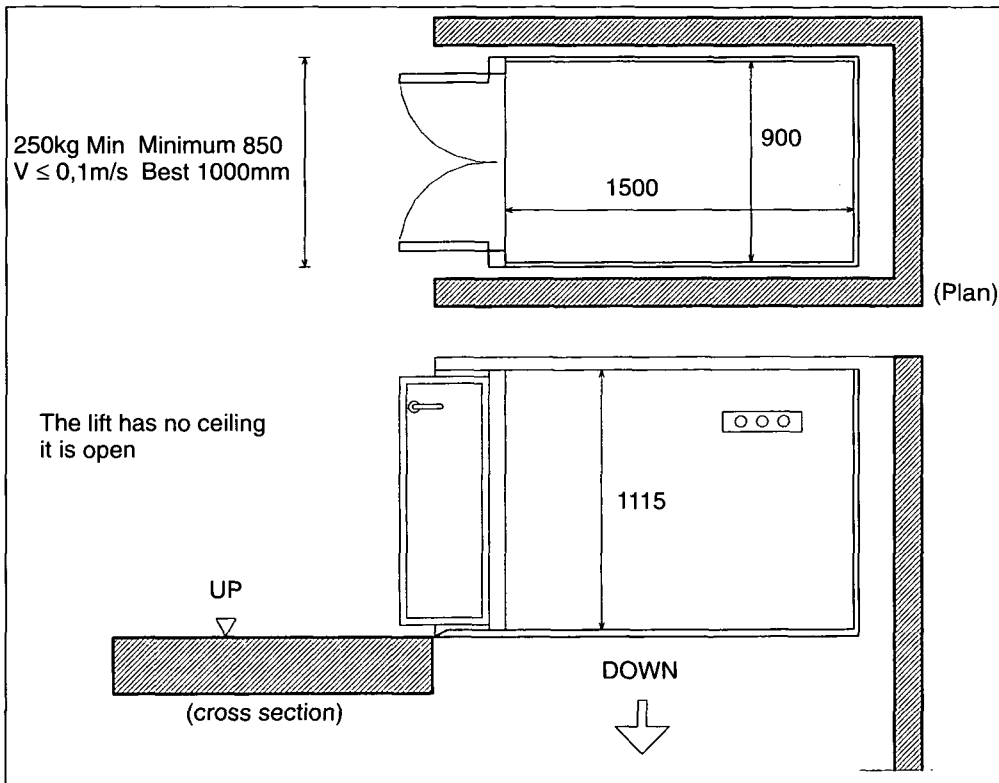
Recommended standard: User-operated
Automatic door(s)
Doors cannot be opened unless lift is on that level
At rest in the 'down' position for safety
Sensors to detect obstructions
Emergency stop button clearly visible
Handrails on both sides of the car (see handrail chart)
Sign recommending wheelchair users to apply brakes

Designers should **always** refer to national regulations (including safety) when considering use of open lifts.

LIGHTING

Purpose
To ensure that all passengers can find their way and travel safely
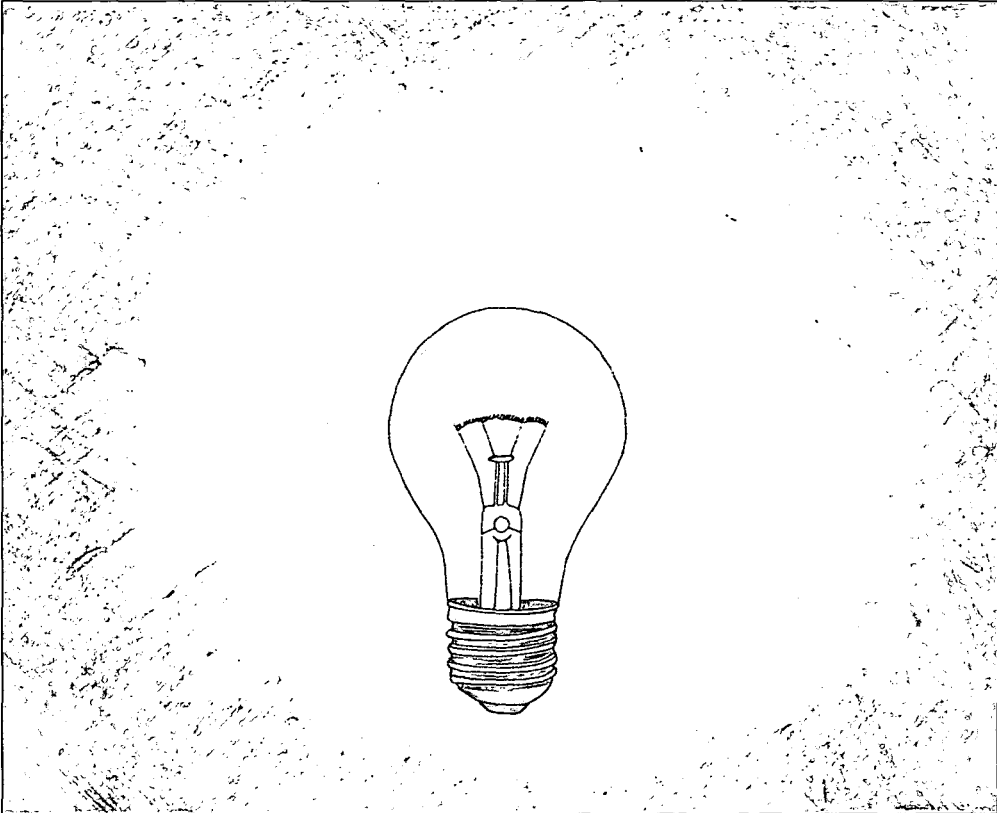
- **Platform:**   Best – 100 lux, Standard – 50 lux, Minimum – 20 lux
  The minimum luminance on the platform edge relative to the average luminance on an open platform shall not exceed 1 : 2.5
  In a covered area: 1 : 5 for minor station; 1 : 7.5 for major stations

- **Stairs:**   Standard 120 lux, with a clear accent placed on the start and end of the stairway

- **Ramp:** Standard 50 lux, with accents of max. 100 lux at the start, the end, and at any landings. If the ramp is located between two areas where the lighting level is considerably higher, the lighting level of the ramp should be adapted to the surroundings

- **Tunnel/Crossing:** Best 100 lux, Standard 50 lux. Good, clear lighting is required in (subway) passages.

- **Station forecourt:** Setting down and picking up points, crossing points, disabled parking spaces: Best 100 lux, Standard 50 lux, Min. 20 lux

- Additional, even downlighting should be provided at ticket counters and timetables

- Low pressure sodium should not be used due to poor quality light with poor colour rendering properties

- Lighting should never be used as flush mounted floor fittings so that they shine in people's faces

- Lighting should not produce glare or dazzle

Glass Wall Marking

Purpose
To ensure that passengers – especially those with visual impairments – do not mistake large expanses of glass as open space

Glass walls and doors must be marked with prominent signs, logos, emblems or decorative features at eye height (1.50-2.00 m), contrasting with the surrounding area, especially for visually impaired passengers. For people with a lower eye level, such as children and wheelchair users, markings should be repeated at a lower level (0.85-1.00m). Care should be taken that the markings chosen are clear – not confusing – for visually impaired passengers.

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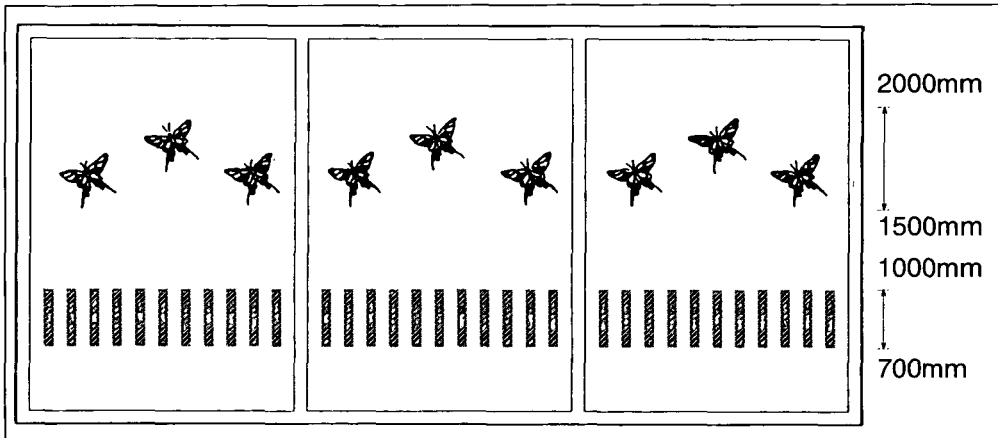
Minimum/Standard: Marking at 1.50-2.00 m,
Markings contrast with the surrounding area
Markings > 150 mm

Best: Marking at 1.50-2.00 m and at 0.85-1.00m,
Markings contrast with the surrounding area
Markings > 150 mm

Marking detail
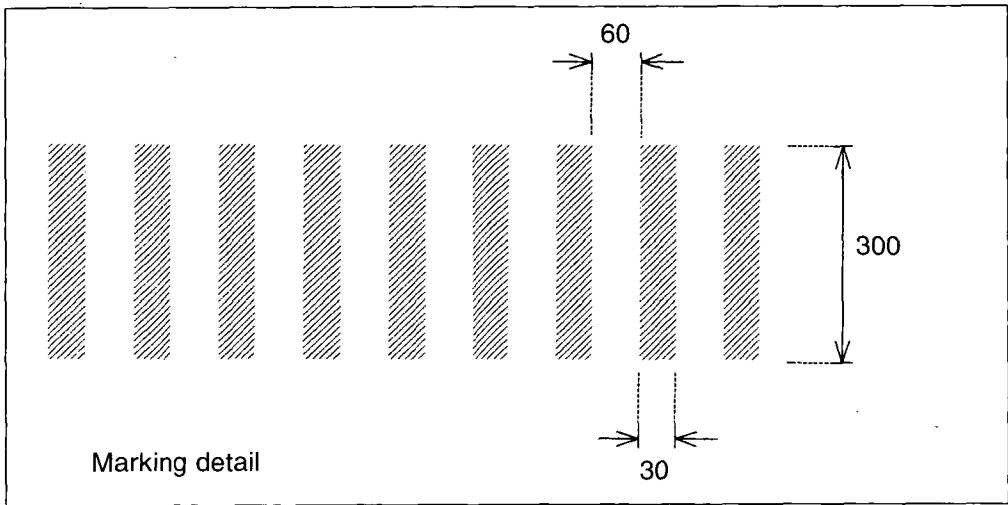
Clean, smoke-free stations

Purpose
To ensure that passengers with environmental impairments are not prevented from travelling
To ensure that passengers who do not like smoking can travel in comfort
To reduce the risk of fire
To provide passengers with reduced mobility with clean, safe toilet facilities to reduce the risk of slipping, and enable the clean, safe use of handrails etc.
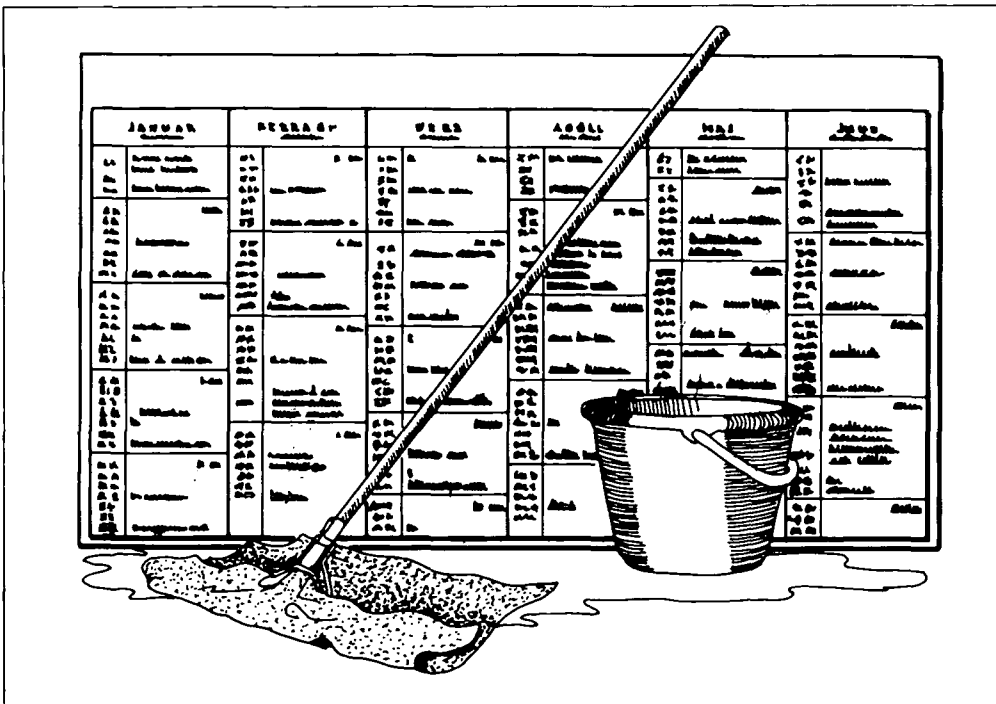
Recommended standard: No-smoking environment with enclosed smokers' area

Plenty of ash-trays at entrances – out of line of travel

Clearly signed no-smoking

Staff request passengers not to smoke if necessary

Some facilities with 'animal-free' zones, especially if enclosed[1]

Cleaning materials to be stored out of the way in their own cupboards

After regular cleaning according to overall plan for station

Emergency cleaning teams available for spillages etc.

Appropriate warning of slippery floor when cleaning is in progress

Minimum: Clearly signed no-smoking areas available in all facilities

Staff request passengers not to smoke if necessary

Some facilities with 'animal-free' zones, especially if enclosed

Cleaning materials to be stored out of the way in their own cupboards

After regular cleaning according to overall plan for station

Appropriate warning of slippery floor when cleaning is in progress

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[1] Assistance dog owners must have access to all facilities – so within any facility an 'animal-free' zone will be appropriate. Even this may prevent difficulties, if assistance dog owners cannot see where they are, and staff should be sensitive to this.

Toilets

Purpose
To ensure that all passengers have easily accessible toilet facilities to use.

1. Space requirements

- The room should have sufficient unobstructed floor space to allow 360-degree turn for wheelchairs.
- For an optimum solution, the room should be large enough to allow a free floor space on both sides of the WC (a and b).
- For a minimum room, free floor space (e) on one side of the toilet may be reduced.
- Door widths see "Doors" chart

Best Wide free floor space on both sides of the wc   Minimum Wide free floor space on one side of the wc
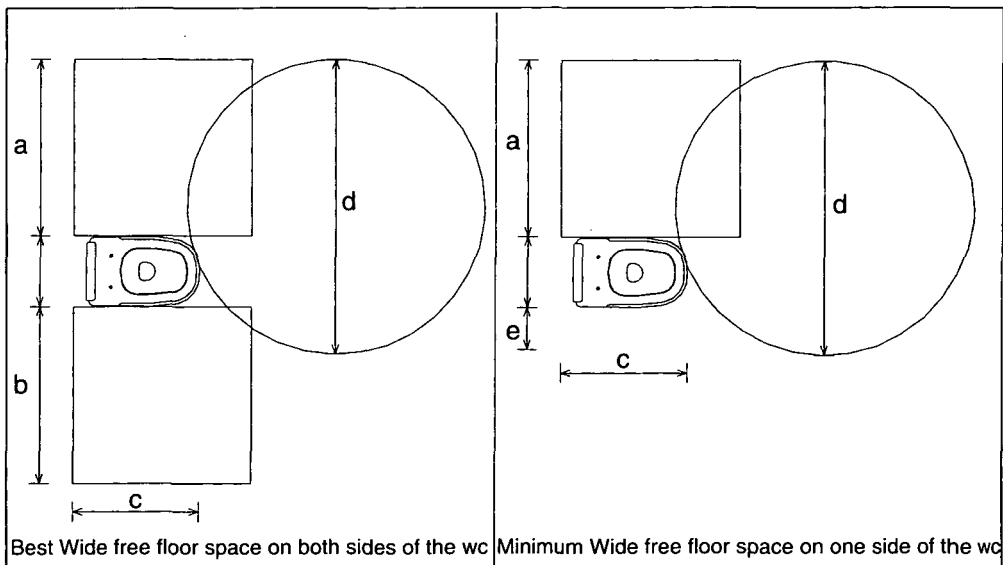
a and b: Best 900mm. Minimum: 800mm
c: Best 850mm. Minimum: 750mm
d: see Passages and Space for Turning chart
e: Minimum: 250mm

Provision, dimensions and layout

- It must be possible to access the WC in a straight line (no angles to be negotiated by wheelchair).
- Accessible toilets may be provided as a unisex facility.
- The lavatory bowl shall be located in such a way that is it easily accessible for the wheelchair user.
- Provision should be made where possible for person to wash whilst on the toilet
- Best solution will normally require room dimensions 2.5 x 2.2m. Minimum solution will normally require room dimensions 2.15 x 1.55m. When the minimum is used, an accessible wash hand basin must be provided in an adjoining, accessible room.
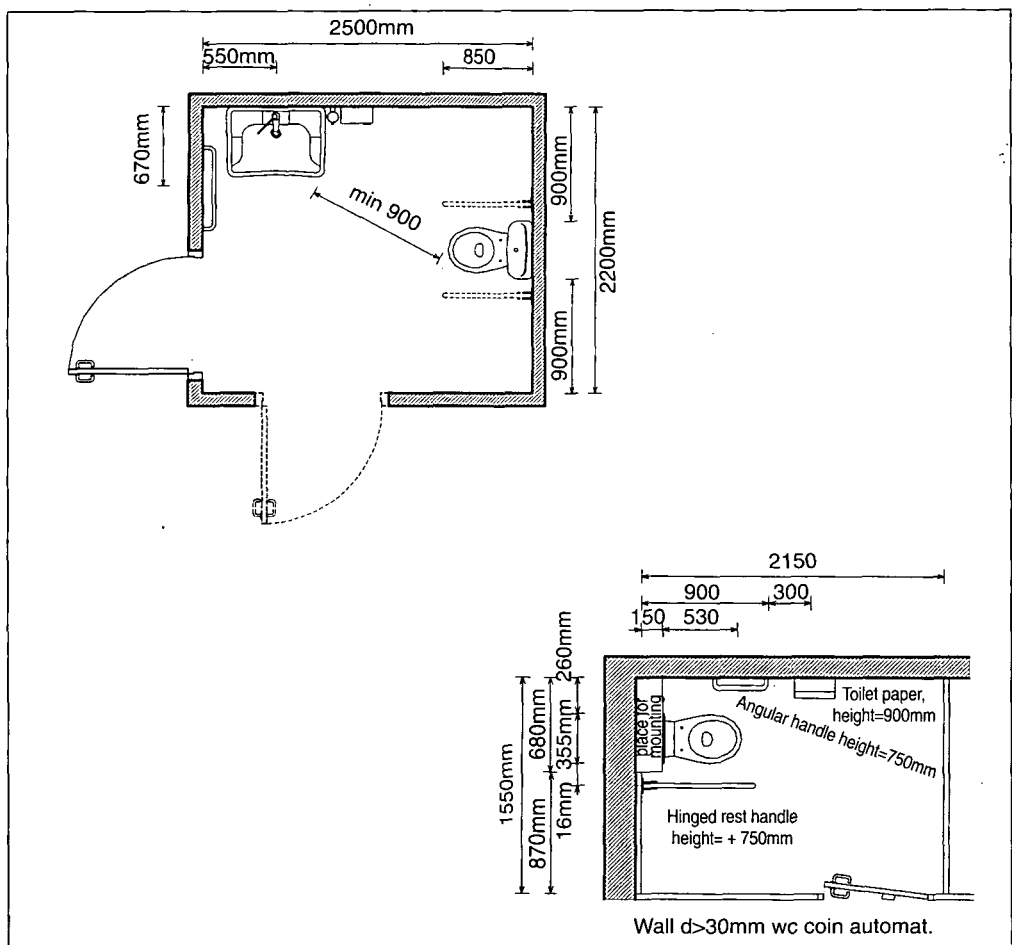
Platforms

Purpose
To ensure that passengers may walk safely along platforms
To ensure that passengers may wait safely on platforms for their train
To ensure that passengers may board safely and with ease

Edge marking/warning zone/stand clearline

Edge marking/warning zone/stand clearline
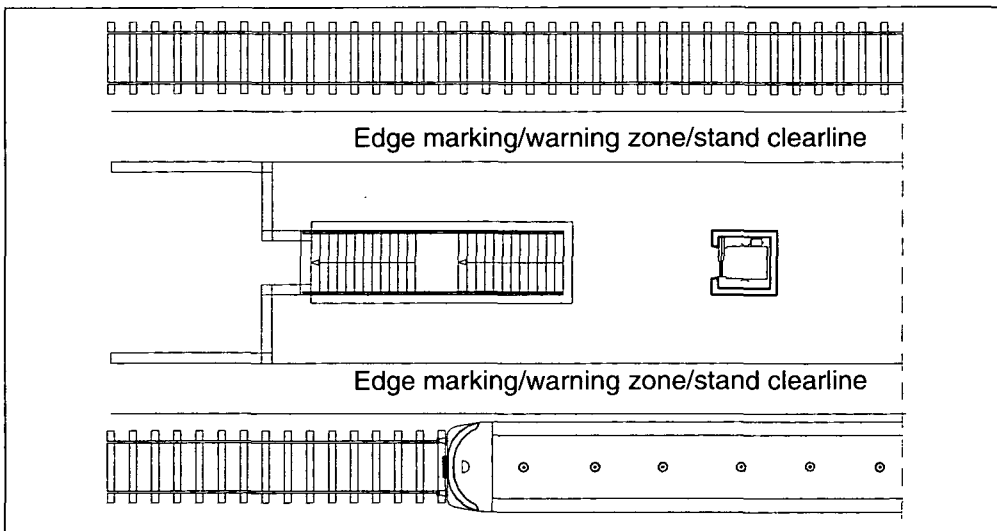
Recommended standard: Colour contrasted 'stand-clear' line[1] at appropriate distance from platform edge for local train speeds
Drainage system appropriate to local conditions to avoid standing water / ice
Gradients near platform edge must be away from the tracks

1 Paint may be more appropriate for the 'stand-clear' line than a permanent inlay into the platform, if train speeds are likely to change.

Guidepath for people with visual impairments on the safe side of the safety line (see Guidepaths on Platforms chart)
Platform edge tactile warning, colour contrasted (Tactile Flooring chart)

At least 2.5m clear platform before edge to enable wheelchair users to pass
Sheltered waiting areas with seating, audible and visual train announcements, train timetables
Good even lighting (see Lighting chart), lighting columns placed out of line of travel

Minimum: Colour contrasted 'stand-clear' line2 at appropriate distance from platform edge for local train speeds
Drainage system appropriate to local conditions to avoid standing water / ice
Gradients near platform edge must be away from the tracks
Guidepath for people with visual impairments on the safe side of the safety line (see Guidepaths on Platforms chart)
At least 2.5m clear platform between buildings / walls and platform edge to enable wheelchair users to pass
Sheltered waiting areas with seating, audible and visual train announcements, train timetables
Good even lighting (see Lighting chart), lighting columns placed out of line of travel

Crossing Tracks

Purpose
To ensure that, where passengers must cross the tracks, this can be done safely and smoothly
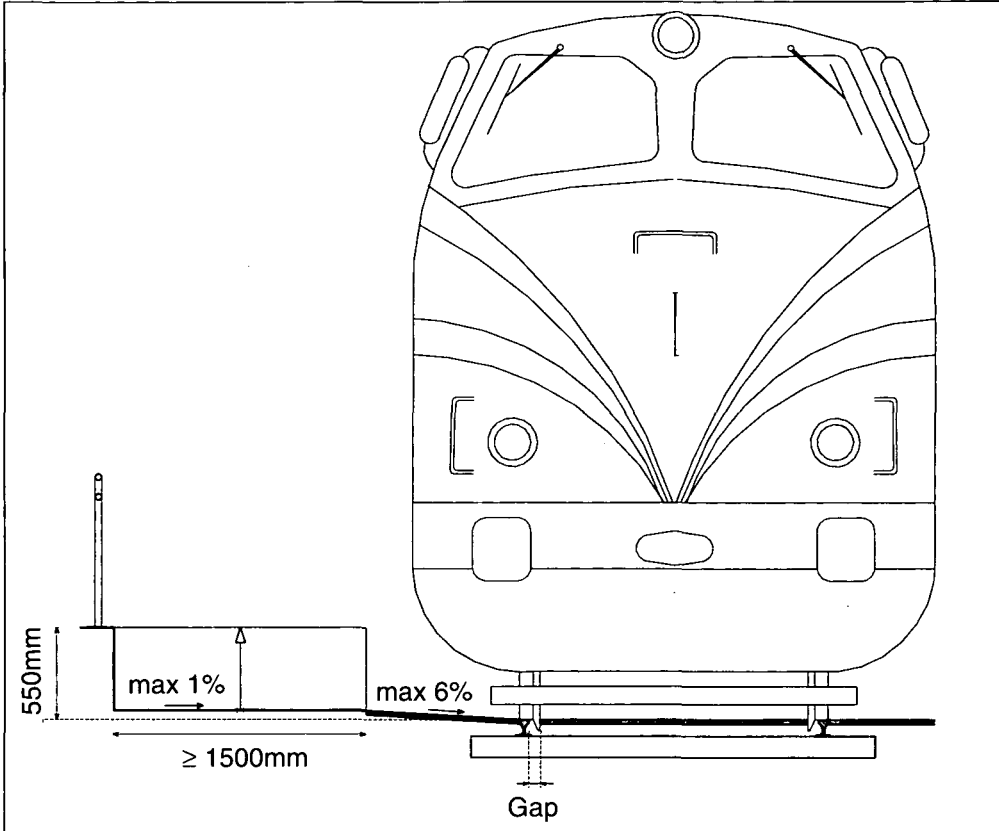
There will be national safety standards for the railway relating to track crossings and these should always be followed. The points below relate to access for disabled passengers – not to general level/track crossing design.

Best: For safety reasons track crossings should be avoided. For wheelchair users, and visually impaired people who use a touch cane, the standard gap of 70 mm can cause problems. However, this may be the only practical solution in an emergency

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and in small rural unstaffed stations with little traffic.

Recommended standard: Gap < 20 mm (for white cane users)
Gradient 5% (1:20)

Minimum: Gap 70 mm
Gradient 6% (1:16)

Where a voice communication system (e.g. phone) is provided with the nearest signal box, provision must be made for deaf and hard of hearing passengers.

Loudspeaker procedures, positioning and selection

Purpose
To provide and transmit easily understandable and useable spoken information.
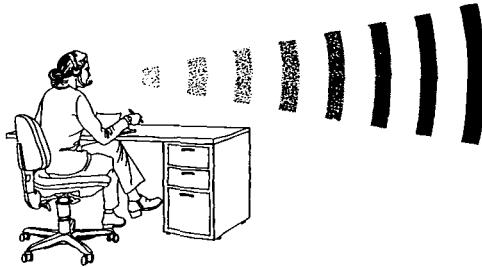
Functional requirements	Format and content
The format and content of the messages should be easily recognisable	Clear enunciation Accurate, consistent and concise information; no superfluous wording. Localised information – to a specific platform.
The content should be appropriate	Minimum: Warnings of danger, evacuation etc Non routine information (changes of platform, delays etc) Best: Warnings, travel information, other messages for travellers
The sound should be transmitted and reproduced	Articulation losses, particularly loss of faithfully consonants should be kept to a minimum
The audio signals should have adequate loudness and clarity in all areas used by the public	Even spread of sound to all areas used by the public. Induction loops at appropriate places.

Planning and staff training

- Acoustics consultants should be brought into the design process at an early stage and for each application; building form, layout and the use of materials influence the acoustics.
- The staff should be trained in enunciation, use of equipment, purpose of the communication (to put anxious travellers at ease, to reduce staff harassment), and the needs of disabled travellers (hearing/visual impairments, learning difficulties etc.)

Timing of messages

Minimum	Best
Messages repeated twice	Messages repeated three times
Messages should never conflict with other loudspeaker announcements	As minimum +: Messages timed when background noise is low
Before arrival, never after the train has departed	

Calculations and technical requirements

Reverberation time (inflection/ absorption)	
Ambient noise level	
Sound Pressure Levels (SPL)	SPL at 1,2 – 1,7 m above floor level 80dB
Speech Transmission Index	Best 10-15 %ALcons Minimum15-3%ALcons
Articulation Loss	0,5-0,458 RASTI; equal coverage at 4kHz octave band
Frequency response	Minimum 400-5000 Hz
Total Harmonic Distortion	< 10

Emergency exits

Purpose
To ensure that disabled passengers can get out of the station in the event of an emergency

Disabled people in an crowd during evacuation may interrupt the pattern of flow, and slow down the rate at which people can be evacuated.

Where doors are positioned close to changes in direction, this can create almost insurmountable barriers for disabled people, and will cause considerably slower passenger flow.

Requirements

• sufficient passage widths, particularly through escape doors
• escape doors positioned in the direction of the escape route
• safe landings and resting places
• provision of personal assistance
• where emergency routes for disabled passengers are different, they should be clearly signed
• emergency lighting at floor level and around doors assists everyone in a smoky or dark environment
• provision should be made both for people with hearing impairment (visual information) and for people with visual impairment (audible information)

Example of a preferred solution

Area of rescue assistance must provide same protection and fire rating as stairway

One possible location for AREA OF RESCUE ASSISTANCE sign

Areas of Refuge/Rescue Assistance Inside Exit Stairways

Two way communicator

Instructions for use of space and communicator

Exit sign (required by building/ fire safety codes)

AREA OF RESCUE ASSISTANCE

Directional sign indicating location of nearest area of rescue assistance

Permanent room/space sign incomidor (must display Exit in raised lettering and braille with a required AREA OF RESCUE ASSISTANCE, sign located here

A Horizontal Exit Can Meet the Requirement for Areas of Rescue Assistance

The level connection of two buildings may be part of a horizontal exit

The level connection between two areas separated by a fire barrier, space, or other form of protection may be part of a horizontal exit.

Area 1A and Building 2 are refuge (areas of rescue assistance) when area 1B is threatened.

Building 1   Building 2

Alarms

Purpose
To ensure that all passengers are alerted by alarm systems for emergencies

Functional requirements

- Alarms should warn everyone present in the building.
- Alarms should be reliable and give adequate information
- Alarms should be distinct and different from other audible signals used on the station

Flashing exit sign with internal and/or external audible signals
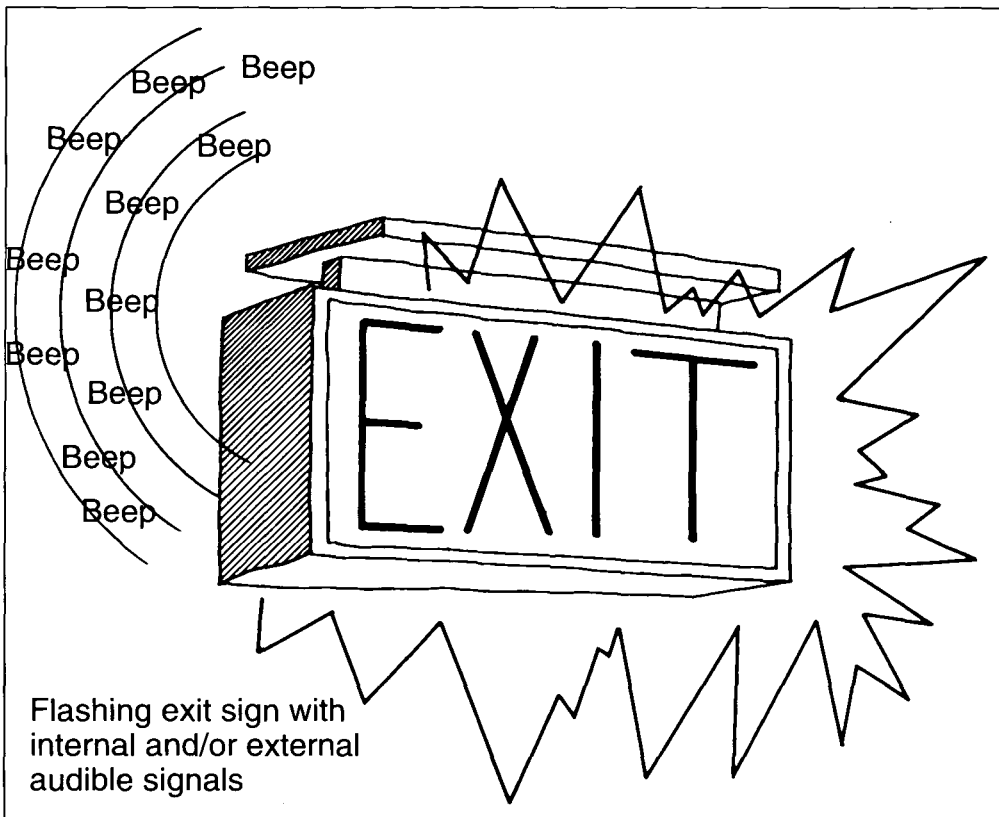
All alarm systems should:

- alert responsible staff to put safety procedures into operation at the earliest possible moment
- ensure rapid evacuation of everyone to a safe place

The warning system should use a combination of sound and light.

The best solution will provide information through loudspeakers (spoken message with brief, clear instruction), text displays/TV monitors and strips of leading lights.

Safety procedures must include rescue/escape assistance for disabled passengers.

Installations

Best	Warning:	Alarm loudspeakers and alarm lights
	Information:	Alarm loudspeakers, leading lights, displays, flashing exit signs
Minimum	Warning:	Alarm bells, sirens or horns, flashing exit signs
Notes: Large stations		Must have both visual and audible warning Must provide visual and audible information on escape
Small stations		May apply the minimum installation
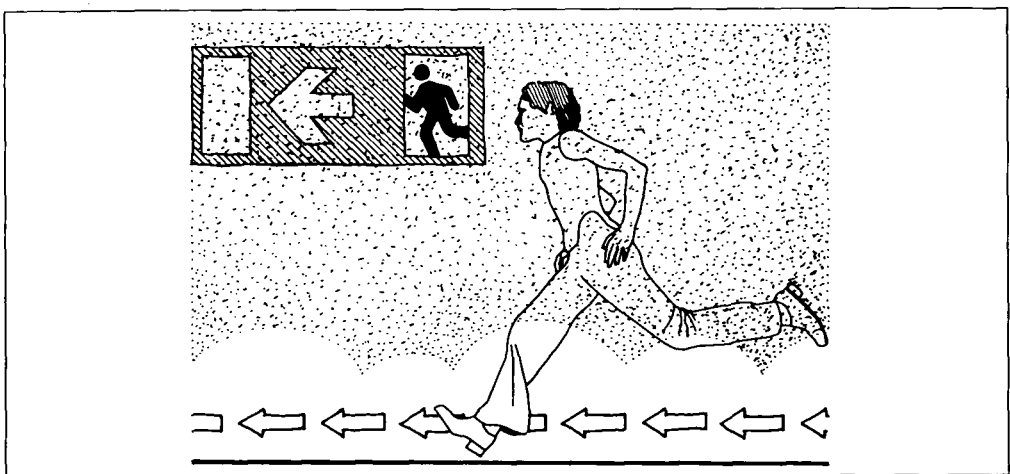
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6   Information

6.1. What is information?

Information can be defined as: *"data organised in such a way that it can be used by people to serve their goals"* (Zwaga, 1999). This definition is rather general. More specific travel information can be defined as: *"data that contribute to the knowledge of the traveller, on which he can make or change his intentions before and/or during the trip"* (Zeilstra, 1995).

A journey is like a chain - it is only as good as its weakest link. When planning a journey we need information about each link in the chain, and this information must be clear and accurate. Lack of information reinforces the confidence barrier to travel.

6.2. Who needs information, and why?

Everyone travelling by rail needs information in order to travel in safety, in comfort and independently. They need to evaluate the possible choices and then make informed decisions about the journey.

Good information enables passengers to:

* Feel in control - e.g. knowing where they are; knowing where they are going; knowing what will happen next; knowing they are safe; knowing they can use the toilet; and knowing that if something does go wrong, there is someone to help out.
* Feel comfortable - e.g. knowing that they can get to and use station and train facilities; knowing that refreshments will be available; knowing that there will be comfortable seats and a comfortable, secure and hygienic environment.

Passengers get information in a wide variety of ways, and we all constantly check and double check the information that we have - although we are often not aware of doing this. Disabled passengers may need more information than others because they cannot make assumptions about access to the different stages of their journey. In addition, the traditional ways that the rail industry provides information may not suit a disabled passenger - who may have, for example, a sight or hearing impairment and needs the information presented in a format accessible to him.

6.3. What information do passengers need, and when?

Table 6.1 below shows the various stages of a journey from A to B and the sort of information people need at each stage.

Table 6.1

Journey stage	Information need
Planning	• What are the possible routes from A to B?
	• What time must I leave A to arrive at B when I need to?
	• Is it a direct route or are there connections to make?
	• Can I afford it?
	• How do I buy a ticket?
	• Can I make the journey independently – how much assistance will I need?
	• What facilities are available en-route, and can I use them?
	• How do I get to the station – and is the set-down/parking area convenient?
At the station – on the concourse	• How do I buy a ticket?
	• What time does the train leave?

Journey stage	Information need
	• Have I got enough time to catch it – if not when does the next train go?
	• What platform does it leave from?
	• Where is it – what is the shortest route?
	• Are there enough signs and landmarks for me to find my way – are there any obstacles en-route?
	• What might I need before or on the train journey? (e.g. book, toilet, refreshments)
	• Can I get them on the train – or should I get them now? Where from?
At the station – on the platform	• Is this the right platform?
	• Will the next train to arrive be mine?
	• Where do I need to wait for my train (to be at the right door)?
	• Is it a safe place to wait (with shelter)?
	• Is this my train?
	• Is this the right carriage?
	• Where is the door (and controls, etc.)?
	• Is there a step / handrail?
On the train	• Is this the right train?
	• Where do I sit?
	• Where do I put my luggage?
	• Where are my at seat facilities (light, etc.)?
	• Which direction and how far are the other facilities (buffet, toilet, etc.)?
	• How many stops before my stop?
	• How will I know it is my stop – will I find out in time?
	• How will I get out?
	• Are there any staff available on the train to help?
On the train – change from normal journey	• Why have we stopped?
	• Is there a route change?
	• Are we late?
	• How do I contact people / rearrange the rest of my journey?

Journey stage	Information need
Changing trains	• Have I got enough time? • What platform do I need? • Can I get there on my own / in time? • Are there any obstacles en-route?
At the destination station	• How do I get out? • Am I on time? • Where do I go for further journey information? • What are the choices of connection? • Where do I get them? • *Here similar information will be needed to that on the departure station concourse, about facilities etc.* • How do I complain about my journey?

This information has to be available from home, and at the station and in the train during the journey.

Figure 6.1. Example pre-journey information system Genvågen (SJ-Sweden)
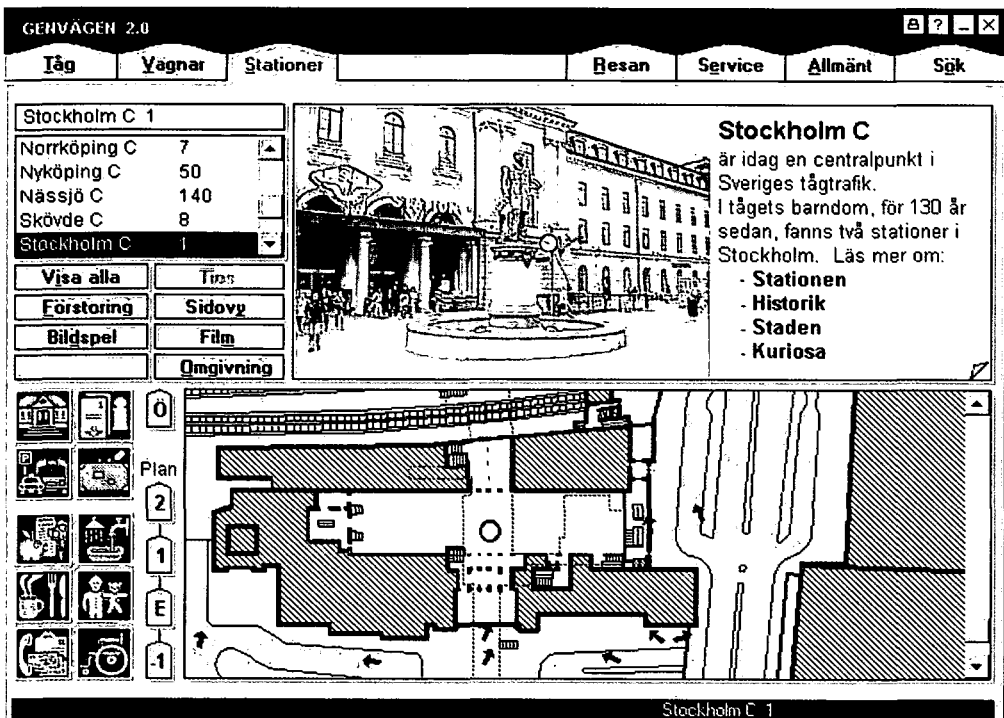
Figure 6.2. Example pre-journey information system Genvågen (SJ-Sweden)
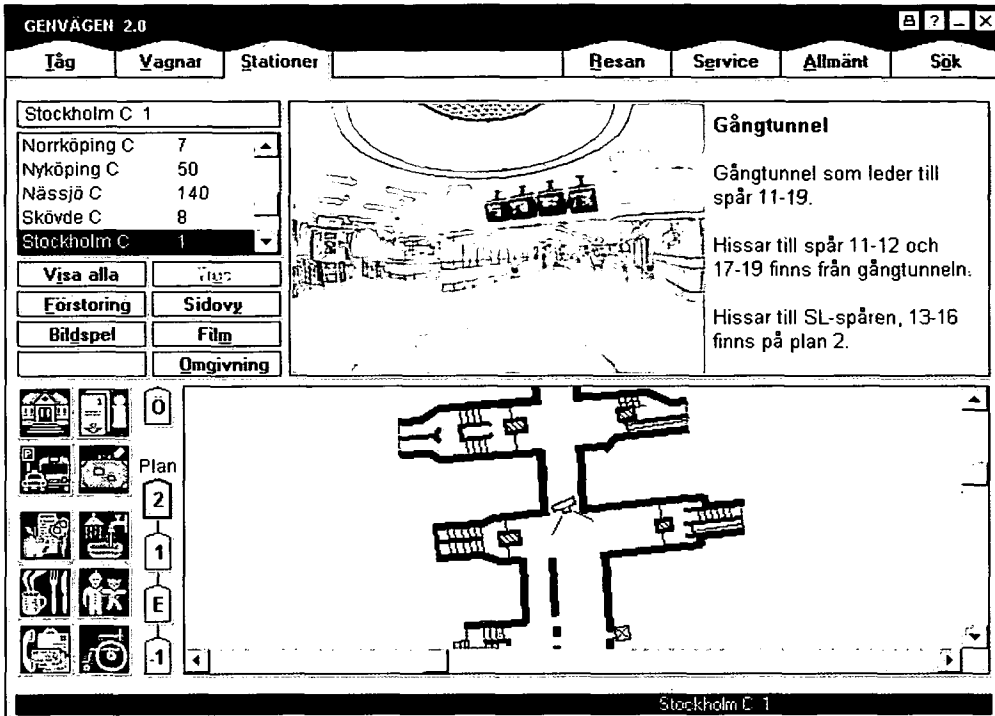
6.4. How should the information be provided?

Information can be static or dynamic. Static information is information that is not updated continuously – for example the printed timetable. Dynamic or real-time information such as information about platform and time of departure is constantly refreshed.

The information can be provided in all sorts of ways. Looking at the questions in Table 6.1, some information is received through the design of the train – for example, where is the door / door control? Some is received visually (is this a safe place to wait?), some audibly (is this the right train?) and some both (what platform do I need?). Where information is not clearly provided, passengers may have to check with others, for example the destination of the train.

All information should be available to all passengers, including people with sensory and communication difficulties. This means providing information in alternative formats, such as large print, Braille, audiotape, disk and so on. Front-line staff of railway organisations must be aware that information is available in these formats, if they are to help passengers effectively. Consistent, simple and cheap access to information will break down the confidence barriers to travel. A 'one-stop-shop' – a seamless approach – that includes information provision, the ability to book tickets, and the ability to arrange assistance where necessary would achieve this goal.

People often give up looking for information if it is not easy to find or understand, or it does not provide all they need on their journey. Information for disabled passengers is often provided separately – as 'special needs' information. But lots of other passengers may need this information. For example, if you have a buggy or pushchair, you will want to know where the step-free routes are, or where you can put your buggy on the train. And many passengers, including older people, are put off by the word 'disability' and do not look for information that would be useful to them when it is identified as information for disabled people.

The European Conference of Ministers of Transport has identified four criteria for good information provision. Information should be:

- Clear;
- Concise;
- Accurate;
- Timely.

Whether the information is made available in a leaflet, on a sign, in response to a telephone call or in any other way, those four criteria must be satisfied if it is to meet the needs of passengers.

- **Clear** means two things: easily legible in the case of textual information whether printed or on a screen or a sign, and easily understood in all cases (including spoken information). Tactile information may also be needed – for example tactile maps, and tactile signs, but these must be displayed appropriately, at the right height, and in places where visually impaired people will find them. Deaf people whose first language is sign language, and people with learning difficulties including dyslexia, in particular need plain language, and pictograms, in order to understand easily. This also helps visitors from other countries who do not speak the language.

- Quite a lot of information is taken in while passengers are en route to their destination perhaps walking or maybe on a bus or a train. They have only a short time to see, read and fully understand the information. So information must be **concise**. International pictograms are particularly useful for taking information in quickly.

- Information in whatever form must be **accurate**. This means more than just making sure that it is correct at the time it is first presented – it must also be checked and updated to make sure that it remains accurate. A mistake in a timetable, or an announcement, can cause problems to any passenger. And to a disabled passengers the consequences can be very serious if poor information causes the journey chain to be broken.

- Information cannot be effectively absorbed and used unless it is **timely**. Thought should be given not just to the content but to the point in the journey when it is needed. To take one simple example, an audible announcement of the next stop on a metro is very helpful particularly to visually impaired people and people with walking difficulties, but it needs to be made in sufficient time for the passenger to get ready to leave the train. An announcement as the train pulls into the station is too late for people who are less agile.

Three further criteria help passengers absorb and use information more effectively:

- Information must be **repeated** at crucial points on the journey. Passengers cannot take in all the information they need before their journey, and will need to be given some of it again as confirmation (for example, train departure times), and some of it only at the appropriate moment (for example, toilet location).

- All information provided must be **consistent**. Passengers will only trust consistent information. If on the concourse, a certain platform is showing, but when they reach the platform, their train is not leaving from that platform, they will begin to doubt all the information that is available. They will then begin to check with staff, and this takes up staff time unnecessarily. It also increases the confidence barrier to travel.

- Information should be **prioritised** into essential and non-essential. For example, passengers need to know where platform one is, and they may also need to know where the café is. But information about platform one is essential, whereas information about the café is not. Where information is not prioritised, passengers may feel overwhelmed, and not be able to absorb the information they really need.

6.5. Specific information for disabled passengers

Transport services change over time and so do the facilities that they offer. Knowledge about public transport services where and when they operate, what the fares are and so on is important for everyone. Lack of knowledge about routes, times and how to use the system presents a barrier to people using it, and they may be unaware that a journey can actually be fulfilled by public transport.

For disabled people, lack of knowledge seems to be a bigger issue because the barriers to travel are greater

anyway. Also, if the passenger does not know what they must do to ensure a successful journey (e.g., arranging special assistance, or avoiding stations with impassable physical obstacles), they may have a bad experience which will put them off in the future.

Specific additional information that may be required by disabled people is identified in table 6.2. The long term goal must be for disabled passengers to be able to travel without needing this specific information. However, in the medium term, information about how to use train transport can be provided by leaflets, press stories, advertisements, local radio and other similar media. Transport training is also useful here (see chapter 7 – Training).

Table 6.2

Passenger group	Specific information need
People with mobility impairments	
walking problems	distances, steps/levels, sitting
wheelchair users	wheelchair accessibility, distances, safe positioning of wheelchair
People with visual impairments	
	wayfinding, interaction with outlets/machines
People with hearing impairments	
	announcements, communication
People with learning difficulties	
	wayfinding, interaction with outlets/machines, announcements, communication
People with other impairments (e.g. asthma)	
	specific provisions (e.g. animal-free carriages), emergency provision

Reliable pre-journey information on the physical accessibility of stations and trains will require an inventory checklist, like the Transport and Tourism For All (TTFA) checklist of access, for setting up a database. This database can be used to provide information on CD-ROM (such as the Swedish Genvågen, or Spanish RENFE systems), and to provide information via the internet and telephone services. Such services enable the rail industry to provide complex or rapidly changing information.

Figure 6.3. Example pre-journey information system Genvågen (SJ-Sweden)
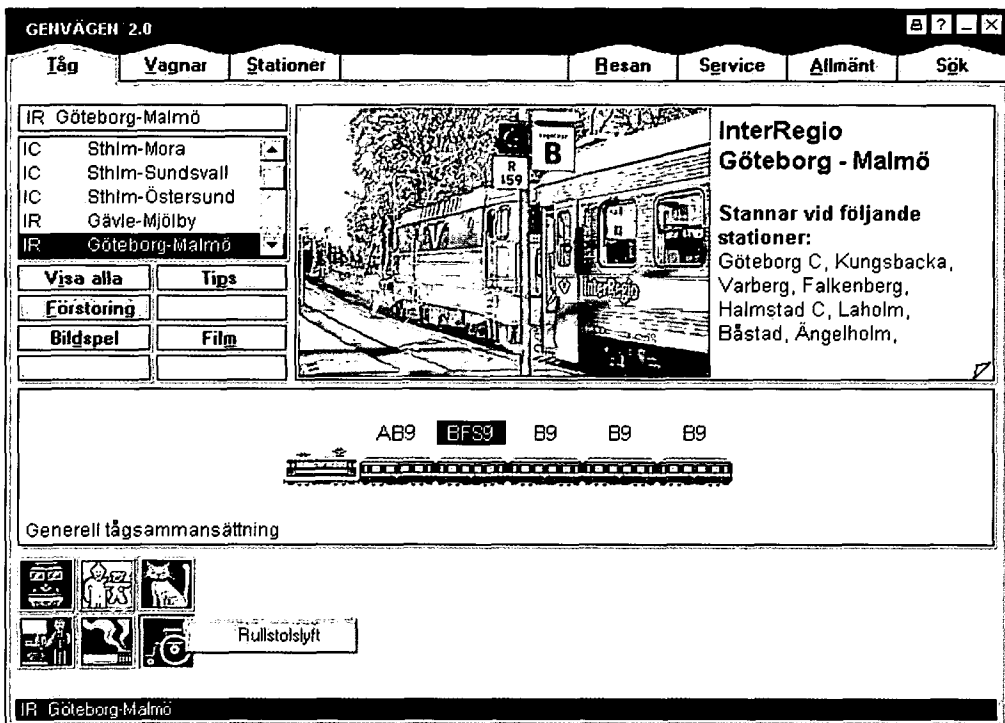
Figure 6.4. Example pre-journey information system Genvågen (SJ-Sweden)
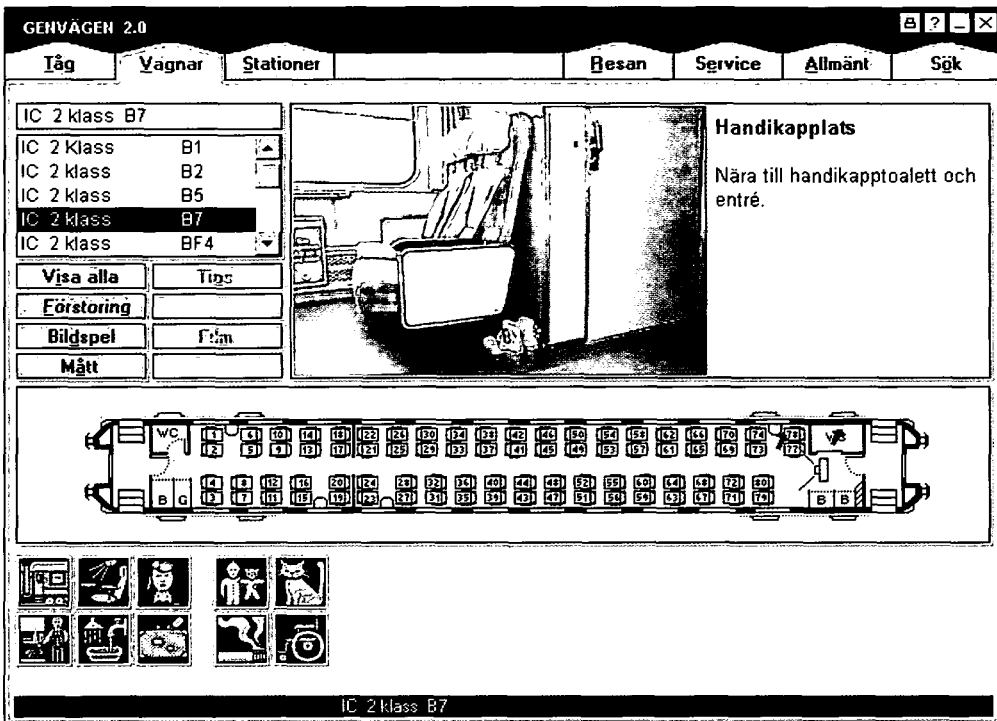
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RICA,Transport Information for People with Disabilities; Summary and Recommendations, London, December 1992.

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7 Training

7.1. Why instruct rail staff how to serve disabled passengers?

Many disabled passengers resent having to plan and arrange their journeys in so much detail. At the moment, disabled people overcome the confidence barrier to rail travel by asking friends or family to help them – or get around the barrier by not travelling by rail. Until fully accessible facilities at stations and on trains are available some pre-planning will always be needed, but even now, sufficient well-trained staff can increase the possibility of train travel at short notice.

The common principles of good practice in training apply, but there are some additional issues that the rail industry needs to take into account.

The objective of staff training is to ensure that disabled passengers have equal access to rail travel and can travel freely and confidently by rail, on the same basis as non-disabled passengers. However, giving equal access is not the same as giving the same treatment. Good training 'bridges the gap' between the skills and qualities needed by rail staff to give disabled passengers a good, seamless service and the confidence to travel, and the skills and qualities that staff already have.

Well-trained staff will be able to interact with non-disabled passengers more effectively, and this will improve the quality of rail services.

7.2. Who should be trained?

All rail industry staff need training – from the Board to the train cleaning crew. This is not because there is anything

magic in serving disabled passengers. However, throughout Europe, disabled people have only recently begun to be included in everyday society. Many staff in the railway were not educated alongside disabled people, they have not worked with disabled people, and their view of disabled people, along with most people outside the rail industry, is that disabled people are different, and need special treatment.

The important thing is to train staff appropriately, according to their role in the organisation – the Board will not need the same training as the train cleaning crew!

7.3. What form should the training take?

Training does not have to mean off-job courses. It can take the form of:
- briefings, workshops, courses
- on-the-job training by external trainers, or by colleagues
- self-directed learning with books, videos etc.
- spending time with disabled passengers with a view to understanding the barriers they face and how to remove them
- specific supervised projects carried out in the workplace

7.4. What should the training cover?

7.4.1. Senior and middle management

Senior and middle managers need to be aware of the potential problems that face disabled passengers. Training, in whatever form, must enable them to recognise the *systemic* factors in the way their organisation operates – policies, practices, procedures – that serve to build and maintain barriers to travel. They need to understand how to go about dismantling these barriers – changing 'the way we do things around here'. Importantly, however, such training will have little impact unless managers understand and

accept that disabled people have a right to equal access to rail transport, and some equality training will therefore be needed.

A clear understanding of the changes that can be made without additional cost will encourage managers to implement them. In addition, understanding the importance of including changes that will involve cost into the future plans of the organisation will reduce the resistance to improving access.

Time constraints on management often means that regular briefings are the most effective way to deliver training.

7.4.2. Design and development staff

Designers and developers need to be aware of the physical barriers that disabled people encounter in the railway environment and how to avoid or remove them. They must be brought up-to-date on current legislation relating to design for disabled people, and on current best practice in inclusive design.

As with managers, understanding the importance of including changes that will involve cost into the future plans of the organisation will reduce the resistance to improving access.

Training for designers can often be effectively delivered using supervised projects in the working environment.

7.4.3. Front-line staff

There are two areas of training for front-line staff. First, such staff need to be trained in good customer service to disabled passengers. Secondly, staff who use special equipment such as text telephones or platform lifts need to be trained in the safe and effective use of this equipment.

Customer service

An effective way to train staff in the problems and barriers that disabled passengers encounter on their journey is to chart the journey a disabled passenger would make and to identify the barriers en route.

Staff will also need fully to understand the system that disabled passengers have to use to make a successful journey by rail, in order that they can explain any stage of the journey to a passenger. This will help to ensure that the disabled passenger experiences consistent treatment across the rail network, and that they themselves can more easily 'learn' the system. The system includes access at specific stations and to rolling stock, fare structures etc.

Understanding the journey, and the system, will enable staff to support disabled passengers more effectively when the journey goes wrong for whatever reason – delays, disruptions or human error by staff or passenger.

Staff will need to understand specific issues for people with different impairments and to practice the skills. These include communicating with people with hearing impairments, supporting people with learning difficulties, guiding people with visual impairments and pushing a wheelchair. Most important, however, is the need to pay attention to the way an individual disabled person wishes to be treated and to be flexible.

As with all passengers, staff need to be courteous at all times, and to recognise that an 'awkward' passenger may have had a difficult journey, and need appropriate support. Staff also need to be trained in disability etiquette – the appropriate way to behave towards disabled people and the language to use in relation to disability. Many disabled people are extremely sensitive about this. Extra time may

be needed for some disabled passengers, and they should not be made to feel as if they are a strain on rail staff.

Staff need to receive an aide-mémoire of useful information available both for them and for passengers, the formats it is available in (e.g. large print), and where it may be obtained.

In some countries, other transport providers (such as taxi companies) form part of the rail assistance network. For example, in Sweden, taxi drivers assist, by pre-arrangement, disabled passengers from the train at stations where rail staff are not available. Training in good customer service for disabled passengers must be available to these providers also, or the travel chain will break. There are some good examples of integrated services (Netherlands, Finland) in which disability awareness training is part of the training of taxi drivers.

Equipment

Staff need to be fully trained in health and safety issues relating to equipment used, and in the preferred way that disabled people wish to be assisted. On-the-job training by colleagues is not always the best way to achieve this, as bad habits and misunderstandings can too easily be passed on.

It is particularly important to ensure that this training is kept up-to-date, as some equipment may rarely be used, and therefore staff will not benefit from practice in its use. Additionally, staff should be trained in how to recognise malfunctions in equipment, and what to do about them.

7.5. Who should design and deliver the training?

Competent and professional trainers who have both training skills and experience of disability are vital. Trainers with personal experience of disability can often 'kick-start' the

process of raising awareness, because they themselves are role-models of disabled passengers – and can demonstrate that disabled passengers are just 'normal' passengers with specific needs.

There is always tension, as with other forms of training, between choosing trainers from inside the organisation who know the way the organisation works, and can relate to the staff involved, and choosing external trainers, who bring a fresh approach, and may question some of the deeply rooted practices that exist in the organisation and maintain the barriers to equal access.

The best solution may be to use external consultants, with dedicated support from Human Resource professionals inside the organisation. In any event, disabled people must *always* be involved in the design and/or delivery of the training if it is to have any credibility with disabled passengers. However, where disabled people are involved, their expertise should be recognised and appropriate payment made – otherwise their contribution is devalued, and the training with it.

7.6. Other issues

7.6.1. Keeping staff up-to-date

Sending staff on a training course, and then letting them loose on the public and hoping for the best, will not be enough. Staff will need regular refresher sessions to help them keep their skills, knowledge and attitudes up-to-date. This can be achieved by focus groups with disabled passengers, looking to improve the facilities and systems available to both staff and disabled passengers, as well as by additional training per se.

7.6.2. Recruitment

Just as the customer service qualities of job applicants are taken into account in staff recruitment, so attitudes towards disabled people should be considered. Recruiting the right staff to begin with will help ensure that any training provided is effective.

7.6.3. Modelling good practice

Training provided should always be fully accessible, delivered in an accessible environment and with materials provided in alternative formats. This models good practice for those receiving the training, and ensures that disabled staff are able to join in the training without elaborate pre-arrangements being made.

7.7. What about training passengers?

In reality the railways will not be accessible enough to allow totally independent travel for some time. Disabled passengers will need 'specialist' knowledge of how to use the system – which stations / trains are accessible, how to get information, how to arrange assistance and so on.

In addition, because public transport has only recently begun to be accessible for disabled people, in many European countries disabled people are reluctant to use it, and travel training will help to overcome the confidence barrier.

Travel training will usually involve accompanied journeys for disabled passengers on the train. This can also be a good way to train staff, as long as an experienced member of staff or trainer leads the expedition.

7.8. Examples of training materials available

Many of the examples listed are not specifically intended for the railway – indeed some are specifically for other industries, even outside transport. There is very little available for the rail industry itself, and much work needs to be done here.

It's a bloody nuisance
Access by Design – Implementing the Disability Discrimination Act 1995 Centre for Accessible Environments 1996 UK

Educating Peter
Hearing Concern 1996 UK

Serving Customers with Disabilities
Salenger Films 1994 USA

Stand up the real Glynn Vernon
Vanson Wardle 1996 UK

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8 Cost-benefit analysis

In the context of this study it has not been possible to do a comprehensive cost-benefit analysis. No single equation is possible because every railway in Europe has a different starting point. However, it is clear that an improvement in features for accessibility also results in an increase in the overall quality of the rail service; such a service will attract more passengers and therefore generate more income for the transport operator.

8.1. The cost

8.1.1. The cost of the rolling stock

The additonal cost of providing accessibility features in rolling stock will differ between designing and building new accessible rail vehicles and the cost of retro-fitting existing rolling stock to improve accessibility.

For new rolling stock, estimates from the industry indicate that the additional cost of building fully accessible trains is at maximum 5% for commuter trains and for Intercity/Eurocity trains. Regional trains would fall within this range.

The difference in additional cost will arise from the features required for each train service, such as accessible toilets, which may only be provided on trains for longer distances.

This on-cost is considered to be relatively minor, particularly when they are set against the life of the rolling stock, frequently 30 years or more.

Retro-fitting equipment to existing vehicles, which may occur at a time of refurbishment, will depend on the structure already available. It is therefore only possible to indicate a sample menu of equipment and indicative cost. On the whole, retro-fitting is a more expensive solution than

building in improvements at the design stage, but nevertheless will permit earlier progress towards accessibility for many railways.

Sample costs for individual items of equipment are shown in paragraph 8.1.3 below.

8.1.2. The cost of the stations

Changes in the operating structure of rail companies across Europe means that stations are often – or will become – the property of the state rather than the railway company. Stations and infrastructure are therefore usually financed out of public funds rather than a direct charge on the rail operators.

The responsibility for providing accessibility will also lie with those responsible for the stations.

Chapter 5 has described the features which will be required to consider stations as fully accessible. These would apply, in general, whether the station was a major city terminus, or a small local or regional station. But the total cost will clearly differ.

As was clear from chapter 5, the major cost element is to provide level access wherever possible for boarding trains and also level access within stations and to station facilities.

The cost of changing platform heights cannot be given within the context of this report. It depends too much on local circumstances. In one country or situation they might be negligible, whereas in other countries or situation they could be considerable. It is also clear that this is a topic which will have to be addressed between governments at the European level.

Whenever a station is being built as new, or is subject to a major refurbishment, level access can be achieved at

minimal cost. However, in most situations, ramps and lifts would need to be provided within the stations.

Over short distances ramps, whenever they can be realised, do usually not cause excessive additional cost. Lifts, however, tend to be rather expensive, not only in purchase price, but also in maintenance.The cost of lift access to a two platform footbridge would be in the order of approximately Euro 450,000.

Apart from these elements facilities such as induction loops, tactile edges and markings, which are common to both new and existing stations, construe a cost element, although a relatively minor one. A number of elements to be provided for and their cost are listed hereunder, all figures in Euros:

- ramps   200 p/m^2
- automatic doors   15,000 each
- accessible toilet at stations 15,000 each
- double handrails on stairs   100 p/m
- glass markings   20 per area of glass
- guideways   100 p/m
- warning markings   100 p/m
- obstacle markings   200 p/m^2
- indications in relief   400 each
- spoken information   150 per transmitter

It is recognised that not all such expenditure on stations could be undertaken within a short timetable. It may therefore not be necessary to make every railway station immediately accessible in the most comprehensive way. Depending on local circumstances and the availability of alternative services, *in the short term* it might be acceptable that only the key stations on reach route or fully accessible, without doing so at the intermediate stations. If this approach is adopted, it would be crucial to ensure that alternative provision, such as "train-taxis" or feeder bus

services, should be made available from these intermediate stations, in order to give full customer service.

Routine maintenance and refurbishment programmes should include access improvements.

8.1.3. Interim or intermediate solutions

Recognising that it will take a long time to introduce new rolling stock and rebuild stations on basis of a uniform European platform height, there are nevertheless many things which can be done - often at low cost - to improve access on a much shorter time scale.

For instance,

- Boarding aids (whether station or train based). Table 8.1 shows that the cost of ramps lies between Euro 500 and 2,300 and on board lifts cost between about Euro 4,000 and 8,000.
- Toilets in trains.
- Handrails in trains.
- Instead of making a whole dining car accessible, trolley services could be offered.

8.1.4. Additional cost elements

Information. Providing better information to travellers, as described in chapter 6, will require both effort and some expenditure. It quickly becomes clear that such effort is critical for the railways to attract and retain *all* passengers, not just those with disabilities. The expenditure therefore should not be viewed as as on-cost of accessibility, but as part of the normal marketing and customer service budgets.

Staff training. A similar argument would also apply to the cost of training staff. Staff training is fundamentally about customer service, again applicable to *all* passengers. Such

cost should not be viewed as an on-cost of making railways accessible to people with disabilities.

Staff levels. Some of the recommendations within the report indicate the need for additional staff to assist passengers with disabilities. It is obvious that whenever assistance of staff is required this will add cost. Currently, rail companies are actively working to reduce staff numbers. It should be appreciated, however, that staff availability is a key issue for passengers, and rail operators would be well advised not to go too far in reducing staff. For example, staff availability is also an important consideration in relation to passenger perceptions of personal safety, a factor which may influence women travellers.

In the context of disabled passengers, since the long-term goal is to have a fully accessible rail service which people with reduced mobility can use independently, the need for assistance for the majority of people is temporary.

Again, no specific cost can be given, as these will vary between rail operators. Where they can be identified, such cost should be put in the context of the entire operation.

Boarding times. Use of boarding aids, such as ramps and lifts, can mean an increase of the dwell time at a station, when they are deployed. As they will normally only be required for boarding/alighting of wheelchair users, the frequency of their use will not be statistically significant within the rail operating cost.

8.1.5. The operational cost of wheelchair accessibility

It is sometimes alleged that accessibility of public transport for wheelchair users is prohibitive for smooth and quick stopovers at stations. It is, therefore, essential to observe that the use of public transport by wheelchair users will be limited in numbers, compared to the use of such transport

in total. For instance, in The Netherlands there are some 80,000 wheelchair users. Should they use public transport as much as the average Dutchman they would travel on average 0.1 times per day. On an annual basis this would amount to maximum 3 million additional journeys. That again would amount to some 5 per thousand additional journeys.

But there will be a cost, particularly if staff assistance is required to operate the equipment and assist the passenger. The long term goal has to be level access. When that becomes a reality, experience with low-floor buses has shown that any increase in boarding times due to wheelchairs has been more than offset by a reduction in boarding time for other passengers.

Experience with low floor buses gives no reason to assume a negative effect of wheelchair accessibility on the stopover times at bus stops. It has been shown to be perfectly achievable to remain within the regular schedules. That is only logical, since most passengers embark and disembark even quicker on low floor equipment. The number of passengers who will need a boarding aid is limited and is negligible with regard to causing extended stopover times.

The overall conclusion is, therefore, that even increasing numbers of wheelchair users will not cause a significant problem for time schedules.

8.5. Benefits

Chapter 2 highlighted the potential numbers of additional passengers resulting from demographic trends within Europe, who could be reached with policies for full accessibility. It is also important to note that these same demographics show that the traditional market for railways, the proportion of people aged between 15 and 59, will

progressively decline over the next few decades, making the search for such new markets even more important.

This report has not tried to calculate these developments in hard figures for rail transport. Examples have been sought of actual changes in passenger patronage arising from the introduction of fully accessible transport, either in rail or more particularly in bus travel.

It is difficult to translate such potential into real demand, particularly for the rail industry which has little experience of accessibility at the present time. However, elsewhere in public transport, accessible bus services have been established in various parts of Europe for some time and there have been some very positive increases in passenger patronage achieved in many instances.

Results from studies on and experiences with accessible bus transport show an increase in patronage of some 15%.

Conclusions from a 1993 study of travel intentions undertaken in the Netherlands on accessibility effects show that with a minimum scenario of accessibility improvements the number of journeys by people of 55 years of age and older in rail transport would increase by two additional trips per person per year. Within the Netherlands that means between 3.9 and 4.8 million additional trips by train.

All in all and taking into consideration that the populations are getting older fast, it is fair to assume that accessible rail transport - combined with accessible transport in the pre and post phases of the journey - will generate more passenger kilometres and thus more income from revenue for the rail operator.

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9   Marketing

9.1. Development of a marketing strategy

From consideration of the general needs of the growing population of disabled and elderly people across Europe, and the guidance and examples given in this report, it is clear that increases in passenger numbers *can* be achieved through making public transport accessible to disabled people. This requires much more than just providing boarding equipment for wheelchair users to use trains.

What is required is a commitment to a two-fold strategy:

a) The removal of *all* barriers to travel by rail, for *all* members of society.

b) Positive marketing plans to promote rail travel, particularly targeted at groups and individuals who are prevented by the lack of access from considering rail travel.

9.2. Marketing strategy

Exploitation of the opportunities described, even with governmental support, requires a comprehensive marketing plan.

It is not enough for railways to make the services available; they must be also targeted at the potential customers and fully supported in a comprehensive manner.

Given an overall objective to increase passenger numbers through an accessibility policy, there would be two main elements to Marketing Strategy:

I.   Identification of target market sectors and their detailed needs.

II. Development of plans to meet these needs, focused on these target market sectors.

9.2.1. Identification of markets

a. Mobility impaired and elderly people include people with a wide variety of needs and travel patterns.

Amongst mobility impaired people, for example, as the total environment becomes more accessible, we can expect that their travel needs will be broadly similar to those of other people in the same age group. But the emphasis may differ, and so might the travel pattern.

The travel needs of elderly people will also differ, if taken as a group. Cost will remain a major factor, introducing opportunities in off-peak travel, for example.

Quantifying and segmenting the markets has to be a major goal.

A major study which indicates positive approaches was conducted for Travel and Tourism for All in 1993. This study analysed tourism in relation to people with disabilities and found that only 3% of tourists have a disability, compared to some 14% of the total population.

Further work analysed the tourist group by levels of disposable income, severity of disability, and the desire to travel. It concluded that around 21 million Europeans would enter the travel market if all facilities and transport were accessible.

Further investigation by railway companies is required into the travel intentions and potential demand from disabled and elderly people, if railways are to target their markets most effectively.

b. In parallel, there are fast-growing opportunities arising for travel to and from Eastern Europe. These opportunities were clearly identified in the Seminar held in Paris in February 1995 by the ECMT Working Group on People with Mobility Handicaps. Many Eastern European countries were involved.

c. Tourism represents an additional area of opportunity. The Travel and Tourism for All study on European tourists has already been cited. There are additionally further external markets. For example, some 50 million Americans have disabilities; they are becoming accustomed to an accessible environment thanks to the Americans with Disabilities Act (ADA). Some of these Americans would be interested in visiting Europe if they could be certain that accessible public transport is generally available.

That is only one country; one external market to be identified. There will be many others.

There is scope for discussion of the external opportunities for tourism to be taken up with DG Enterprise of the European Commission.

9.2.1. Developing market plans

Railways need to develop market-led strategies based on a closer identification of potential markets if they are to maximise their opportunities

Marketing is not only about the identification of market needs; it is also concerned with providing the means to satisfy these needs, and ensuring that potential customers are fully aware of what is available.

A comprehensive marketing plan is a significant undertaking and each railway has to address it in its own

way. Nevertheless, there is a key role for the International Union of Railways (UIC) to encourage a compatible framework and address the issues at a pan-European level.

Marketing plans would also include identification of railways' strengths and weaknesses as a means of shaping strategies to create opportunities.

A major plus for railways in this context is that *main stations are in city centres.* This is of great benefit to disabled and elderly people in comparison with air travel and offers good marketing potential.

Conversely, rail travel in itself cannot be door-to-door. Recognition that railways are in the *travel* market, not the *rail* market can lead to re-defining strategies to deal with this. Such strategies can include:
• Intermodal transfers.
• Partnerships with bus and taxi operators.
• Through ticketing schemes.
• Liaison with local authorities on door-to-door systems.

The Dutch *Treintaxi* and the Swedish *Tågtaxi* ("train taxis") are good examples of the approach.

Railways also have a strong case to offer on environmental grounds and *the avoidance of road congestion.* European Union policies, for example under the Citizens' Network plans, can be used in support of this in marketing the railways.

The above instances indicate some plus features which need to be refined and demonstrated to both the general public and governments. The UIC's role is extremely important in this respect.

Having developed the key selling points, the other major element is to reach the potential users. This must rely on

the detailed identification of market segments previously discussed.

It is, however, most important for the railways to become more vigorous in their marketing and not just rely on potential users to find the railways.

It is crucial to remember that the objective is to attract people who have seldom or never travelled by train, or possibly not travelled at all. They need to be encouraged to make the first steps, and the key to the marketing effort will be to fill them with confidence.

Railways in general, and their governments, need to take a bolder approach.

9.3. Conclusions

- There is a very large potential demand for rail travel for disabled and elderly people. That demand will increase in the future.
- That potential demand can only be reached through a strategy of progressive removal of barriers to travel, affecting disabled and elderly people.
- To turn the potential into real demand, railways must also develop marketing strategies which segment the demand, identify the key user benefits and communicate with the target markets.
- The railways of Europe have much to gain and little to lose from a planned approach to accessibility. Substantial market growth can be achieved.

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Annex II List of Disability Organisations

A large number of disability organisations across Europe were consulted on this draft final report. We would like to thank the following organisations, whose comments have been of great help for the conclusion of this report.

Organisation	Country
UNISDA	F
BG BONN EV	D
ÖZIV-Tyrol	A
Ass. of Disabled Persons in the Czech Republic	CZ
DHR-Swedish Federation of Disabled Persons	S
Danish Association of the Blind	DK
The Danish Council of Org. of Disabled People	DK
The Norwegian Ass. of the Disabled	N
National Ass. of the Disabled	FIN
Finnish Epilepsy Association	FIN
The Finnish Rheumatism Association	FIN
Mav RT, Gépészeti Szakigazgatosag, Személykocsidivizio	H
Parkinson Disease Society	UK
COLITRAH	F
KVG-Vorming vzw	B
Blinderzorg licht en liefde vzw	B
Behinderte und Öffenlicher Verkehr	D
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Handikappförgundens Samarbetsorgan	S
VDK Deutschland	D
Italian Deaf Association	I
VZW Toengankelijkheidsbureau	B
Unione Italiana Ciechi	I
RADAR	UK

Annex III COST 335 Memorandum of Understanding

Brussels, 4 July 1996
COST 283/96

Memorandum of Understanding

for the implementation of a European Concerted Research
Action designated as
COST Action 335

"Passenger accessibility of heavy rail systems"

The Signatories to this Memorandum of Understanding,
declaring their common intention to participate in the
concerted Action referred to above and described in the
Technical Annex to the Memorandum, have reached the
following understanding:

1. The Action will be carried out in accordance with the
   provisions of document COST 400/94 "Rules and
   Procedures for Implementing COST Actions", the
   contents of which are fully known to the Signatories.

2. The main objective of the Action is to produce guidance
   for governments and railway operators on best practice
   in achieving full accessibility to their services and
   facilities. The Action will address both technical and
   economic issues and, in particular, the extent to which
   totally independent access can be achieved.

3. The overall cost of the activities carried out under the
   Action has been estimated, on the basis of information
   available during the planning of the Action, at
   ECU 2,5 million at 1996 prices.

4. The Memorandum of Understanding will take effect on
   being signed by at least 5 Signatories.

5. The Memorandum of Understanding will remain in force for a period of 3 years, unless the duration of the Action is modified according to the provisions of Chapter 6 of the document referred to in Point 1 above.

TECHNICAL ANNEX

COST 335

Passenger accessibility of heavy rail systems

A. BACKGROUND

Justification

Disabled and elderly people can only plan and undertake journeys if they can be confident that all stages of the journey will provide compatible levels of accessibility. Rail travel, both local and long distance, is an obvious field in which compatibility between access provisions is required. Without it, the scope for disabled and elderly people to make use of the European rail network is very limited.

There has already been some useful work at a European level in this area. A joint working party of the UIC and the ECMT has drawn up guidelines on access to rolling stock for EuroCity and other International services. In addition, the UIC itself has set up a working group of national railways to look at the scope for compatibility between practices and specifications in this area.

While this work is making a valuable contribution to technical understanding of these matters, its remit does not extend to the wider social and political considerations.

The purpose of the Action is therefore to provide a framework for this wideranging approach and to give renewed impetus to this key area of transport policy.

A COST Action is a particularly appropriate forum for this work because it can bring together a wide range of participating countries on the basis of sharing expertise and experience and of working together to formulate new technical and policy directions.

This forum will also encourage the implementation of this approach in line with the development of the Task Force "Trains and railway systems of the future" recently initiated by the European Union.

Scope

The approach is based on non-discrimination. It is in line with the European Union Green Paper on the Citizens' Network calling for developing public transport systems with higher quality and equitable access for all.

Measures for accessibility – such as self-opening doors, ramps etc. – will increase the quality for other people as well. Measures for quality – such as good information, serving meals at seat, train taxis etc. – will increase the accessibility for disabled and elderly people as well.

There is a substantial actual and potential passenger market for the railways in this area. The term "disability" covers a wide range of very different impairments – physical, sensory and cognitive. Some definitions relate to medical conditions; it is, however, more appropriate in a travel-related context to consider functionallybased criteria to describe the wider range of people who might have difficulty in travelling. Additionally, there are many people who are not disabled, but to whom policies and facilities designed for disabled people would be helpful.

These include:
- elderly people;
- people encumbered by luggage, pushchairs, heavy shopping, small children, etc.;
- those unable to speak or understand the local language, such as tourists.

On the previous broad definition the scope of "disability" would include:

- people with mobility handicaps including:
  - wheelchair users;
  - people with severe or slight walking difficulty;
  - people unable to climb steps;
  - people with difficulties in gripping and balancing;
- people with sensory impairments including blind people and those with impaired vision;
- people with impaired hearing and profoundly deaf people;
- people with speech impairment or without speech;
- people with cognitive difficulties.

Potential market

There is inconsistency between countries in both the detailed definitions of disability and in how measurement is effected. It is, therefore, difficult to collate international statistics with any precision. The current consensus view, however, is that approximately 12% of the population of the European Union is disabled. (This is derived from both formal and informal studies).

This represents some 41 million disabled people in the EU alone and over 50 million in Europe as a whole.

The corresponding figure for the USA is 43 million disabled people.

Within these figures some other useful points can be noted:
- wheelchair users represent only around 6-7% of the total number of disabled people;
- approximately two-thirds of disabled people have a mobility handicap, i.e. around 7,5% of the population;
- approximately two-thirds of disabled people are elderly (i.e. aged 60 or over).
- a significant number of disabled people will travel with at least one other person.

The correlation between disability and age is an important one. Around 20% of the total European population – approximately 76 million people – are currently aged 60 or above. Eurostat forecasts indicate that this will grow to 110 million, or 28% of the total population, by the year 2000. This is coupled with an absolute decline in numbers of those aged under 60.

From this data, the combined total of disabled and elderly people is approximately 24% of the total European population, i.e. around 100 million, and this figure is expected to rise to over 130 million, above 30% within 25 years.

In order to understand how to reach this potential market it is necessary, on the one hand, to conduct an indepth market study and, on the other hand, to identify the requirements for design and refurbishment.

B. OBJECTIVES AND BENEFITS

The main objective of the Action is to produce guidance for governments and railway operators on best practice in achieving full accessibility to their services and facilities. The Action will address both technical and economic issues and, in particular, the extent to which totally independent access can be achieved.

Secondary objectives will include the raising of awareness among train operators of the actual and potential size of the market for rail travel among disabled and elderly people and giving them a clear indication of the wide range of issues involved in realizing that market potential.

The Action will also consider the implications of its recommendations both for public spending and for competitiveness in the commercial environment.

There will be particular emphasis on the scope for and benefit of cooperation between policy makers, manufacturers, operators and users in moving towards solutions that are both effective and sustainable.

C. SCIENTIFIC PROGRAMME

The Action needs to include a systematic evaluation not only of the facilities and services relevant to the station and rolling stock, but to the whole journey from door-todoor. For many people with mobility difficulties, journeys can only be undertaken if every link in a chain of accessibility is complete. This chain starts with information about the journey before the person has left home and ends only once they have reached their final destination.

In order to draw together all the necessary information, the Scientific Programme will include the following elements:

Economic aspects:
- defining the market;
- the commercial case for accessibility;
- costs of measures, public or private financing, social issues;
- marketing opportunities (niche and core market developments).

Pre-travel information:

(Particular reference to the need to standardize information between operators regarding the continuous provision of transport chain information. Relevant data can be drawn from the RICA Report on transport information for people with disabilities).

- content (what facilities, what services, what help, who to contact);

- quality (accuracy, accessibility, ease of understanding);
- format (large print, braille, audiotape, text telephones);
- availability (interactive terminals and others including teletext, minitel, local radio, local press, etc.).

Access to and within stations:

(Particular reference to establishing both the fundamental minimum requirements and the optimal requirements for accessibility and the importance of compatibility between stations.)

- ease of access (reduction of internal movements, ease of the intermodal connections);
- ticket purchase (including reservations);
- waiting areas;
- toilet facilities;
- catering;
- information and signing (including audible, visual, real time).

Interface between station and rolling stock:

(Emphasis on user needs and functional requirements and on compatibility between crossborder requirements will be done. After the inventory of national situations, the recommendations for achieving a more coherent network will distinguish between new and old facilities).

- platform height (European pre-standardization);
- tactile marking/surfaces;
- boarding/alighting equipment;
- other boarding/alighting aids;
- rolling stock technology to minimise horizontal/vertical gaps;
- luggage transfer.

Rolling stock design:

(For single and double deck trains, for suburban and long distance including the couchette train. In this area relevant data can be drawn from the UIC/ECMT Guidelines).

- doorway width/height;
- gangway width;
- seating layout;
- wheelchair space;
- toilet facilities;
- catering;
- lighting;
- position of handholds;
- colour contrasts, etc.;
- on-train information;
- access to emergency facilities.

Staff:

(With reference to the close link between rolling stock design and the role of staff)

- availability;
- skills and training;
- health and safety issues.

Fare structures:

(With reference to the economic, competitive and deregulation environment of the railways).

- information;
- incentives to travel/fare concessions;
- through ticketing (including transferring between modes).

Group travel:

- availability of wheelchair spaces;

- booking arrangements;
- training/information to the users.

Compatibility and inter-modal transfer:

- compatibility between systems of information, facilities, ticketing, luggage registration;
- transfer/transit information (facilities, availability of staff).

Regulatory framework:

- legislation/regulation;
- codes of practice/guidance;
- maintaining and monitoring standards.

D. ORGANIZATION AND TIMETABLE

The exchange of information will be supported through technical visits and circulation of documents. Common work will be achieved through working groups which will be set up where appropriate.

The following phases will be included:

Phase 1

- To gather and analyse experience from participating members on topics identified above and to identify gaps in knowledge and experience on these topics.
- To draw up principles for good practice under each topic and to develop an evaluation methodology.

Phase 2

- To stimulate the collection of data to fill gaps in knowledge and experience identified in Phase 1.
- To assess scope for compatibility/coordination of existing practices and standards.

Phase 3

- In the light of the results of Phase 2; to establish best practice in each area through case studies, codes of practice and guidelines.
- To disseminate and promulgate best practice to governments and operators.

The dissemination plan includes an opening seminar during Phase 1, an interim report after Phase 2 and a conference after Phase 3.

The estimate of the total duration of the project is three years. Each phase is expected to last one year.

E. ECONOMIC DIMENSION

The economic dimension of the Action is the sum of the national costs incurred by the countries participating in the Action, the costs incurred by international organizations participating in the Action, and the coordination, which will partly be paid by the Commission.

The national costs comprise the personnel costs arising from the involvement of staff in the Action, translation costs not covered by the Commission, acquisition of equipment where necessary and travel expenses not covered by the Commission.

Nine countries and two international organizations actively participated in the preparation of this Action. They are Spain, Finland, France, Italy, Ireland, the Netherlands, the United Kingdom, Sweden, Switzerland, International Union of Railways (UIC) and the European Disability Forum (EDF). On the basis of the information available during the preparation of the Action, they planned to earmark an average of ECU 78 000 each and per year.

The estimate of the total costs including the coordination costs partly paid by the Commission is ECU 2,5 million.

This estimate is valid only if the abovementioned countries and organizations participate in the Action. Any withdrawal or other participation would alter this estimate.

Annex IV. COST Transport Overview

COST Transport is one of 17 domains existing in COST at the present time.

It was to be one of the seven areas seen as best suited for this new form of collaboration, which was officially set up by a Ministerial Conference in November 1971.

The Transport area lends itself particularly well to the COST framework, both because it combines aspects from a number of disciplines, and because of the need for harmonisation at European level. Liaison with the Transport Ministries and Administrations in the various countries is a key element of these COST Actions.

The COST Transport Secretariat is located within the Directorate General for Transport of the European Commission. The location with the staff managing the Fourth and Fifth Framework Transport RTD Programme, as well as the proximity with the Common Transport Policy Directorates, enables close collaboration between Transport Research activities and serves as a basis for further political action.

COST Transport Actions are authorised and supervised by the COST Technical Committee on Transport which, in turn, reports to the COST Committee of Senior Officials. Both of these decision-making bodies comprise representatives of the national governments of the COST countries.

By the end of 1999, the COST Transport domain comprised 13 ongoing Actions, with a total estimated cost of EURO 42.5 Million. 32 Actions have been completed, and a further 4 Actions have been selected and are under preparation.

Completed Actions

COST 30:	Electronic Traffic Aids on Major Roads
COST 30 bis:	Electronic Traffic Aids on Major Roads: Demonstration Project and Further Research
COST 301:	Shore Based Marine Navigation Systems
COST 302:	Technical and Economic Conditions for the Use of Electric Road Vehicles
COST 303:	Technical and Economic Evaluation of National Dual-mode Trolleybus Programmes
COST 304:	Use of Alternative Fuels in Road Vehicles
COST 305:	Data System for the Study of Demand for Interregional Passenger Transport
COST 306:	Automatic Transmission of Data Relating to Transport
COST 307:	Rational Use of Energy in Interregional Transport
COST 308:	Maintenance of Ships
COST 309:	Road Weather Conditions
COST 310:	Freight Transport Logistics
COST 311:	Simulation of Maritime Traffic
COST 312:	Evaluation of the Effects of the Channel Tunnel on Traffic Flows
COST 313:	Socio-economic Cost of Road Accidents
COST 314:	Express Delivery Services
COST 315:	Large Containers
COST 317:	Socio-economic Effects of the Channel Tunnel
COST 318:	Interactions between High-speed Rail and Air Passenger Transport
COST 319:	Estimation of Pollutant Emissions from Transport
COST 320:	The Impact of E.D.I. on Transport
COST 321:	Urban Goods Transport
COST 322:	Low Floor Buses
COST 323:	Weigh-in-Motion of Road Vehicles
COST 324:	Long Term Performance of Road Pavements

COST 325: New Pavement Monitoring Equipment and Methods

COST 326: Electronic Charts for Navigation

COST 328: Integrated Strategic Transport Infrastructure Networks in Europe

COST 329: Models for Traffic and Safety Development and Interventions

COST 330: Teleinformatics Links between Ports and their Partners

COST 331: Requirements for Horizontal Road Marking

COST 333: Development of New Bituminous Pavement Design Method

COST 335: Passengers' Accessibility of Heavy Rail Systems

Actions Underway

COST 327: Motorcycle Safety Helmets

COST 332: Transport and Land-Use Policies

COST 334: Effects of Wide Single Tyres and Dual Tyres

COST 336: Use of Falling Weight Deflectometers in Pavement Evaluation

COST 337: Unbound Granular Materials for Road Pavements

COST 339: Small Containers

COST 341: Habitat Fragmentation due to Transportation Infrastructure

COST 342: Parking Policy Measures and their Effects on Mobility and the Economy

COST 343: Reduction in Road Closures by Improved Maintenance Procedures

COST 344: Improvements to Snow and Ice Control on European Roads and Bridges

COST 345: Procedures Required for Assessing Highway Structures

COST 346: Emissions and Fuel Consumption from Heavy Duty Vehicles

Actions in preparation

COST 338:   Drivers' Visual Information Overload

COST 340:   Towards a European Intermodal Transport
Network: Lessons from History

COST 347:   Pavement Research with Accelerated
Loading Testing Facilities

COST 348:   Reinforcement of Pavements with Steel
Meshes and Geosynthetics

Up-to-date information on COST Transport can be found on the World Wide Web, at the following address: http://www.cordis.lu/cost-transport/home.html.

This report is the output of a collaborative European project in which experts from 17 countries and 4 international organisations took part. The participants represented railway operating and manufacturing industries, goverments and academic experts in the field and representatives of disability organisations.

The purpose of this report is to provide guidance on best practice in meeting the needs of rail travellers with reduced mobility. The report deals with the technical and economic issues involved in achieving access to rolling stock and to stations and with issues of information and training.