

## **PLANNING A BARRIER FREE ENVIRONMENT**

### **Office of the Chief Commissioner for Persons with Disabilities**

#### **PREFACE**

The publication 'Planning a Barrier Free Environment' published in 2001 was hailed as a welcome initiative. The manual is being used extensively to promote barrier free environment. A copy of the manual has been circulated at several workshops organized by the Office of the Chief Commissioner for Persons with Disabilities, **all over the country**.

The overwhelming response to add usefulness of the manual can be gauged by the fact that the third edition is being brought out on great demand *from* various sectors of the society.

Since 2001, over 2000 copies of the manual have been printed. Regional language editions are also planned.

As spelt out clearly in the Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995, a barrier free built environment is essential to facilitate the disabled. It is hoped that this manual will help in bringing us as closer to our goal of an inclusive, barrier free and rights based society as possible.

I deeply appreciate the efforts put in by Ms. Shivani Gupta and Mr. Vikas Sharma of Indian Spinal Injury Center in compiling this much needed and useful manual.

**Dr. Uma Tuli**  
**Chief Commissioner for Persons with Disabilities**

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# **Chapter 1**

## **Scope And Definitions**

### **1.1 Scope**

This manual is concerned with access to, movement within and around, buildings, by people with disabilities. The specifications of this manual are intended to make buildings and facilities accessible to and usable by people with such physical disabilities as the inability to walk, difficulty in walking, reliance on walking aids, blindness and visual impairments, speech and hearing impairments, in-coordination, reaching and manipulation disabilities, lack of stamina, difficulty interpretation and reacting to sensory information, and extremes in physical size.

### **1.2 Definitions**

The following terms shall, for the purpose of this manual, have the meaning indicated in this section: -

*Access Aisle*

An accessible pedestrian space between elements, such as parking spaces, seating and desks, that provides clearances appropriate for use of the elements.

*Accessible*

A site, building, facility, or portion thereof that complies with this manual and that can be approached, entered and used by people with disabilities.

*Accessible Route*

A continuous unobstructed path connecting all accessible elements and spaces in a building or facility that can be negotiated by a severely disabled person using a wheelchair and that is also safe for and usable by people with other disabilities. Interior accessible routes may include corridors, ramps, elevators, lifts, and clear floor space at fixtures. Exterior accessible routes may include parking, access aisles, curb ramps, walkways and ramps

*Ambulatory Disabled*

A person who is able, either with or without personal assistance, and who may depend on prostheses (artificial limbs), orthoses

(calipers), sticks, crutches or walking aids to walk on level or negotiate suitably graded steps provided that convenient handrails are available.

*Automatic Door*

A door equipped with a power operated mechanism and controls that open and close the door automatically upon receipt of a momentary signal. The switch that begins the automatic cycle may be photoelectrical device, floor mat, sensing device, or manual

switch mounted on or near the door itself.

*Beveled*

Smooth, slanted angle between two surfaces; for example, a slant or inclination between two uneven surfaces to allow easier passage of a wheelchair

*Circulation Path*

An exterior or interior way of passage from one place to another for pedestrians, including walkways, hallways, courtyards, stairways and stair landings.

*Clear*

Unobstructed

*Curb*

A side barrier to a trafficable surface

*Curb Ramp*

A short ramp cutting through a curb or built up to it.

*Disabled Person*

A person who, as a consequence of physical disability or impairment, is either ambulant disabled, a wheelchair user, has visual impairment, speech and hearing impairment or learning disability which effects his mobility and use of buildings.

*Grab Bars*

A bar used to give a steadyng or stabilizing assistance to a person engaged in a particular function.

*Handrails*

A rail used in circulation areas such as corridors, passageways, ramps and stairways to assist in continuous movement.

*Individual Washrooms*

A compartment having the basic requirements of a water closet compartment, washbasin and other essential washroom accessories as required by people with disabilities.

*Knurled Surface*

Roughened area, often in a crisscross pattern; used on either doorknobs or grab bars. On doorknobs It is used to provide tactile clues to visually impaired persons to indicate that passage leads to an area of danger. On grab bars it is used to improve grasp and to prevent slipping.

*Operable Parts*

A part of a piece of equipment or appliance used to insert or withdraw objects, or to activate, deactivate, or adjust the equipment or appliance (for example coin slot, pushbutton, handle)

*Public Use*

Describes interior and exterior rooms or spaces that are made available to the general public. Public use may be provided at a building or facility that is privately or publicly owned.

*PWD*

People with disabilities

*Ramp*

An inclined way connecting one level with another.

*Space*

A definable area (for example, toilet room, hall, assembly area, entrance, storage, room alcove, courtyard, or lobby).

*Symbol*

Symbol of Access for the disabled person.

*Tactile*

An object that can be perceived using the sense of touch.

*Water Closet Compartment/Toilet Cubicle*

A compartment having a water closet with grab bars installed to assist people with physical disabilities.

*Wheelchair User*

A person who depends on a wheelchair for mobility

## Chapter 2

### Anthropometrics

#### 2.1 Scope

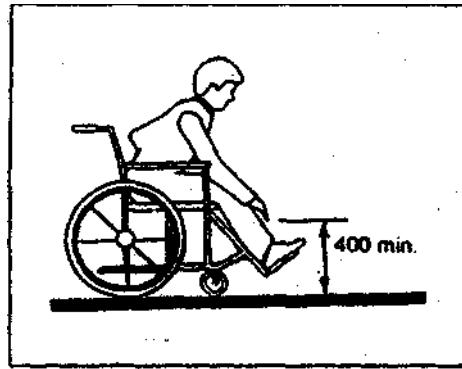
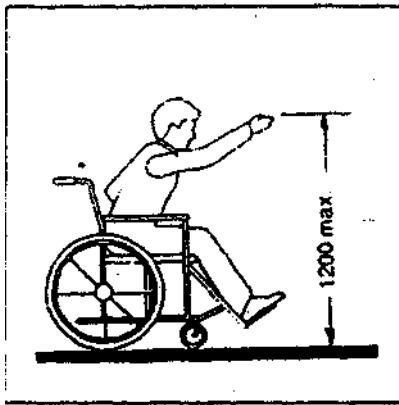
This chapter contains dimensions that can be used for guidance when designing facilities and equipment to be used by persons with disabilities.

#### 2.2. Reach Range

##### 2.2.1. Forward Reach for wheelchair users

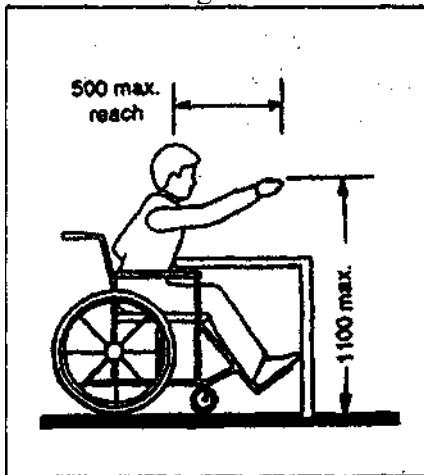
- Without obstruction

The maximum forward reach is 1200mm from the floor and the minimum forward reach is 400mm from the floor as shown in the figure below.



- Over Obstruction

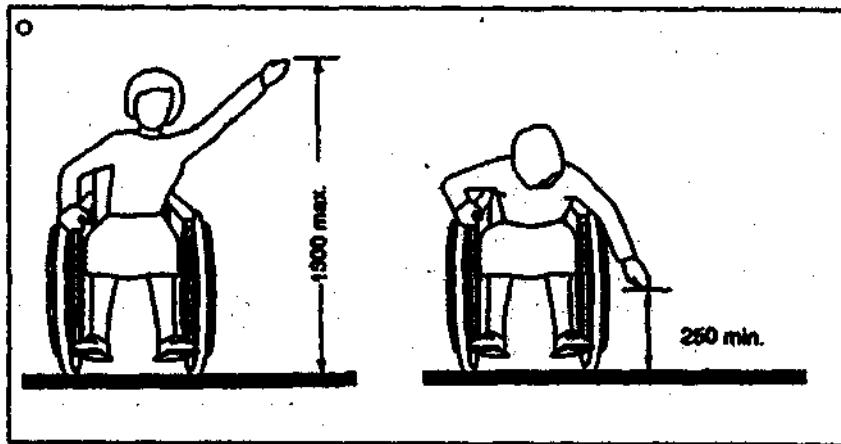
The maximum reach over an obstruction 500mm deep is 1100mm from the floor as shown in the figure below.



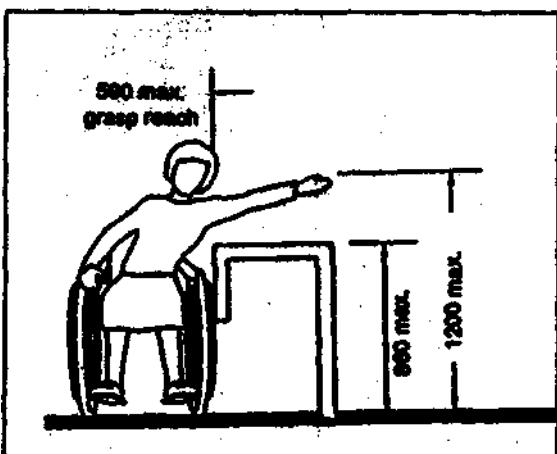
##### 2.2.2. Side Reach for wheelchair users

- Without Obstruction

The maximum side-reach without obstruction is 1300mm from the floor and the minimum side reach is 250mm as shown in the figure below.

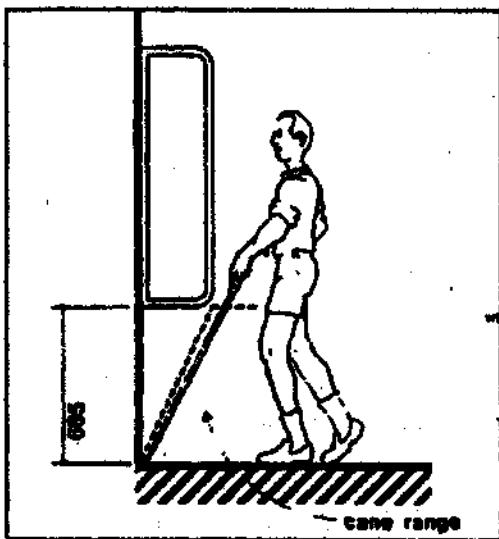


- Over Obstruction

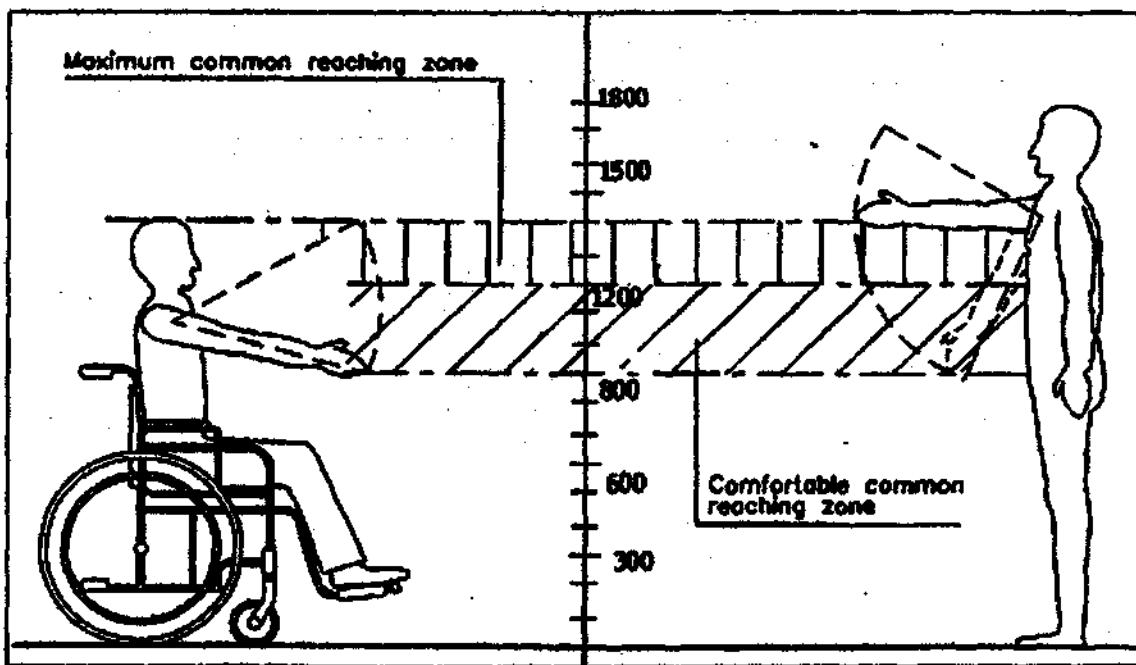


The maximum side reach over an obstruction 860mm high x 500mm deep is 1200mm from the floor as shown in the figure.

### 2.2.3 White Cane Range

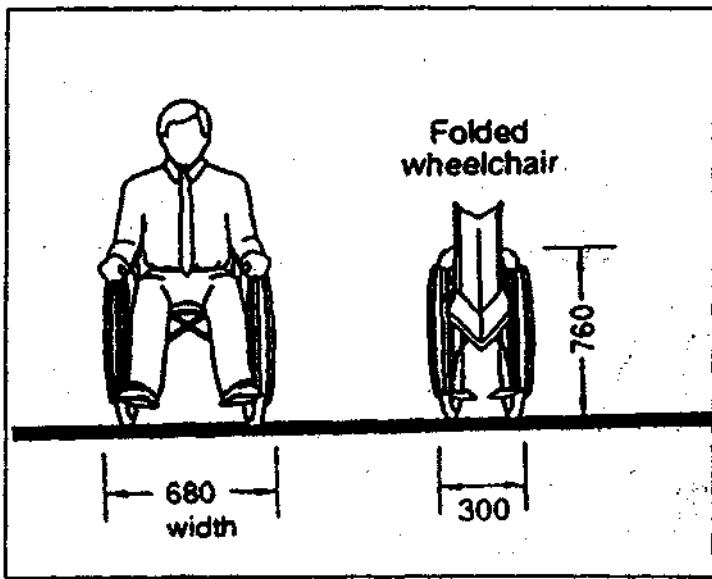
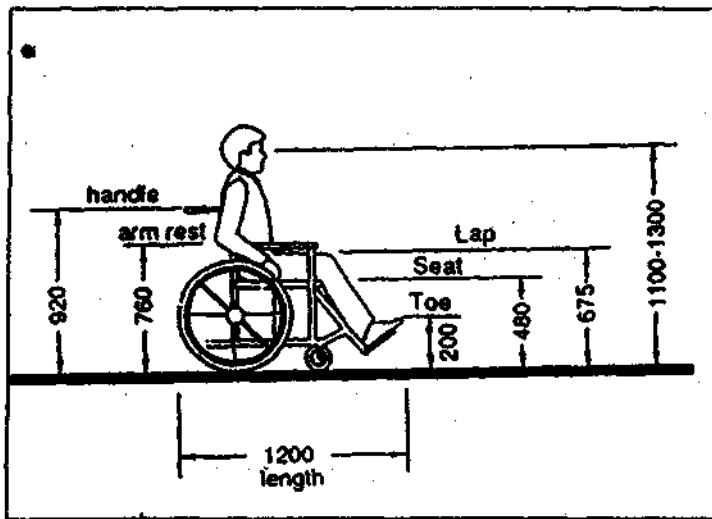


#### 2.2.4 Common Reach Zone



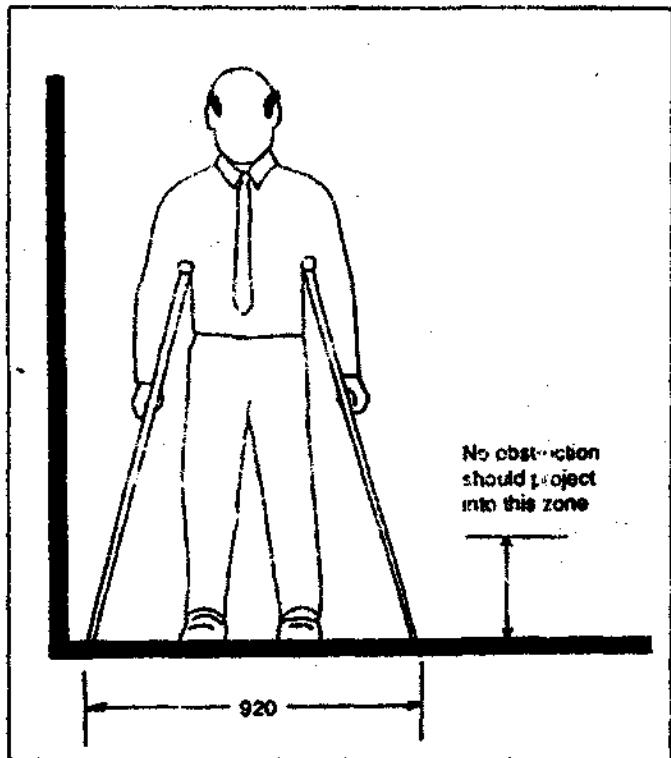
#### 2.3 Wheelchair Dimensions

The figures illustrate some of the typical dimensions of a standard wheelchair. Electric wheelchairs may be of a larger dimension, much heavier and do not have the same maneuverability/capability as manual wheelchairs.

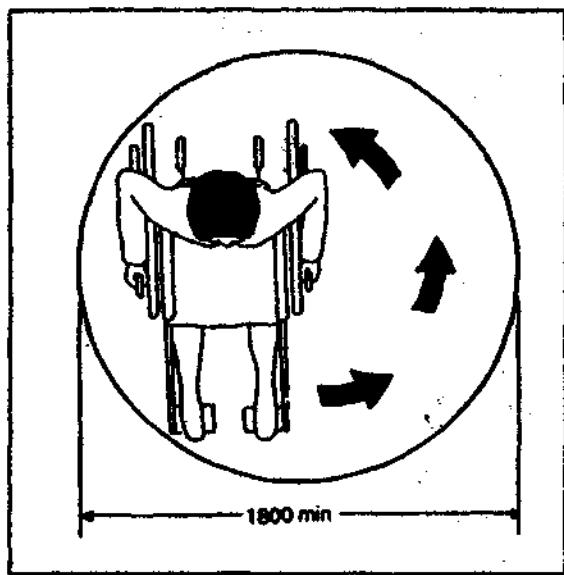


### 2.3.1 Walkway Width For People Using Crutches

Although people who use walking aids can maneuver through door openings of 900mm clear width, they need wider passageways for comfortable gaits as shown in the figure. Crutch tips, often extend down out at a wide angle, are a hazard in narrow passageways where they might not be seen by other pedestrians.

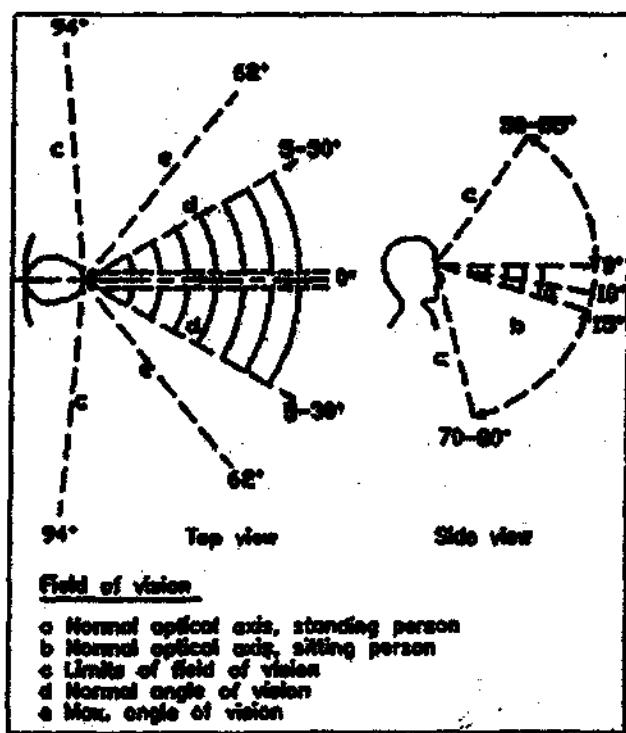


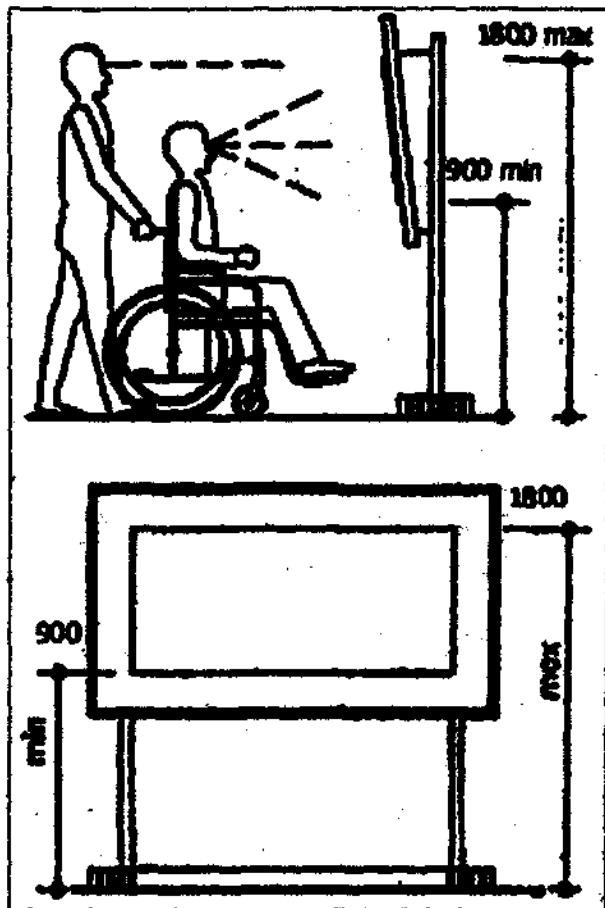
#### 2.4 Circulation Dimensions



Although the minimum required turning radius is 1500mm but it is ideal to provide for a 1800mm turning radius.

#### 2.5 Vision Zone





**Vision Zone**

## 2.6 Heights of People

### 2.6.1 Wheelchair Users

The average height of a person seated on a wheelchair is generally less than 1200mm

### 2.6.2 Standing Person

The average height of a standing person is generally less than 2000mm

## **Chapter 3**

### **Fundamental Needs**

The target group is composed of four major categories:

- People with impaired mobility
- People with visual impairment
- People with hearing impairment
- People with Learning Disabilities and Mental Retardation

#### **3.1. People With Impaired Mobility**

##### ***Wheelchair Users***

The main problem of wheelchair users are about moving and working from a sitting position; thus many requirements are associated with the dimensions and other aspects of wheelchairs. The length of the wheelchair varies generally between 1100mm and 1200mm. The user's feet add approximately 50mm to the overall length.

The width of the wheelchair varies between 600mm and 700mm. To propel a chair manually by operating the rims of the main wheels, a clearance of not less than 50mm, and preferably 100mm is needed. Over longer travel distances, additional space is needed.

Space requirements for maneuvering are always related to the activities to be performed. Different users act in different ways, depending on individual performance and the type of chair used.

When planning spaces in buildings to cater for wheelchair turning, a guide is to impose on the plan to provide a circle of 1800mm diameter. If this space is dear, the plan arrangement will normally be satisfactory. However, spaces in doorways, niches and under worktops, desks or furniture can often be used when turning. Where a high degree of accessibility is required, such as in hospital buildings, spaces should be more generous.

Considerable energy is required to propel a wheelchair manually up ramps, over changes in level or over soft or uneven surfaces. Thresholds and changes in level should be avoided. Ground and floor surface should be hard and even.

Most wheelchairs have a seat height of about 50Qmm. The reach of a wheelchair user is constrained by his seated position. Access to room corners, work benches with base units, etc., is limited by the wheels of the chair and the footrest extension. The reach of wheelchair user is confined to a zone 700mm to 1200mm above floor level and not less than 400mm from room corners.

For wheelchair access to a workbench, washbasin or table, a dear space for knees and footrests is needed. This should be at least 800mm wide, 480mm deep and 750 mm high.

### ***Ambulant Disabled People***

For ambulant disabled people to move securely, ground and floor surfaces should be even and slip resistant. Handrails should be provided on stairs and ramps. Resting places, such as benches, should be provided along travel routes.

Where there is a change of ground or floor surfaces, these should have similar friction, to decrease the risk of stumbling. Benches and chairs should have a seat height of approximately 450mm and they should have armrests approximately 700mm above floor level.

### **3.2. People With Impaired Vision**



For people with impaired vision, orientation can be aided by marking with the use of color, illumination and, in certain cases, the texture of material. Design and plan arrangement should be simple and uncomplicated.

Contrasting colors and warning blocks should be used to aid the identification of doors, stairs, ramps, passageways, etc. Surfaces can be varied to indicate pathway, changes of directions etc. Orientation cues should be specially illuminated. Handrails can be used as a location aid.

To minimize the risk of falls and injuries, hazards such as posts, single steps and projections from walls should be avoided wherever possible. Hazards should be emphasized by means of Illumination and by contrasting colors and materials. If unavoidable, the projections should be placed higher than 2000mm from the floor.

People with impaired vision are often sensitive to glare. Unwanted mirroring effects and reflections may be avoided by attention to the location of windows and illumination, and the choice of floor and wall surface.

People with impaired vision often have difficulty reading signs and other printed information. Blind people are restricted to tactile reading (some can read Braille as well). Visual information in, for example, railway stations and airports should be supplemented with audible information.

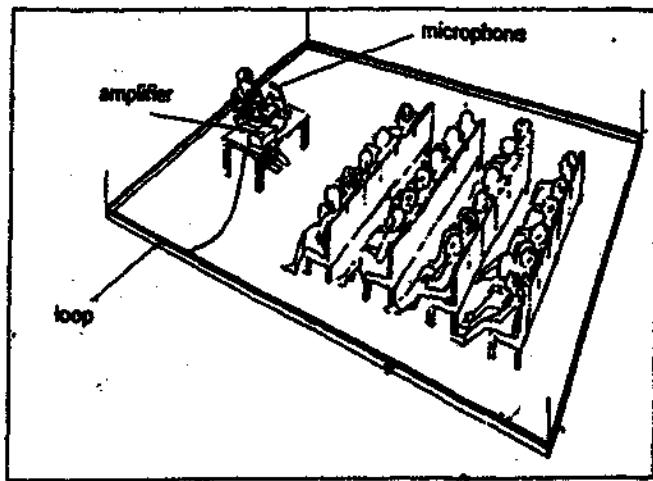
### **3.3. People With Impaired Hearing**

People with impaired hearing have a particular difficulty in comprehending sounds and words in the environment. Rooms should be acoustically well insulated.

In public buildings, loud-speaking systems should be clearly audible. Supplementary visual information should be provided in, for example, railway stations and airports.

People with impaired hearing may rely on lip reading; this is helped if there is good overall light that is non-reflective. They may have difficulty using telephones, etc. Audible signals may, in certain cases, be supplemented with visual signals.

Loop induction units may be installed in auditoria, theaters, meeting rooms, etc., to improve reception for people using hearing aids. Infrared sound reinforcement system may also be provided in multiplex auditoria to avoid



sound overspill from one area to another.

### **3.4. People with Learning Disabilities & Mental Retardation**

There are many different types of disabilities in this group. In addition to congenital deficiencies and various kinds of central nervous system diseases and brain disorders, it covers disabilities caused by an accident or a cerebral hemorrhage.

A considerable number of persons among the mentally impaired are paralytics. In addition to being mentally disabled they may have difficulties in coordinating and controlling their movements.

When moving about out doors, persons in this group are confronted with the special problem that they find it difficult to perceive, comprehend, or interpret information such as signs. They may stumble easily over even minor bumps and fall heavily. They may also have spatial orientation difficulties and in some cases lack the ability to distinguish color or to differentiate between left and right.

It may be difficult to meet all their needs but minimum provisions would include:

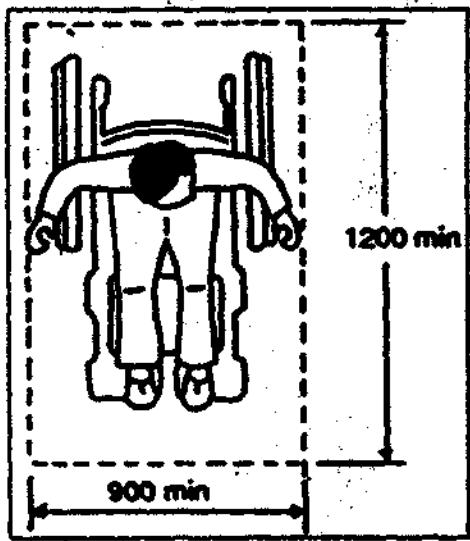
- Clear and easy-to-grasp information as an aid to orientation
- Even road surface

## Chapter 4

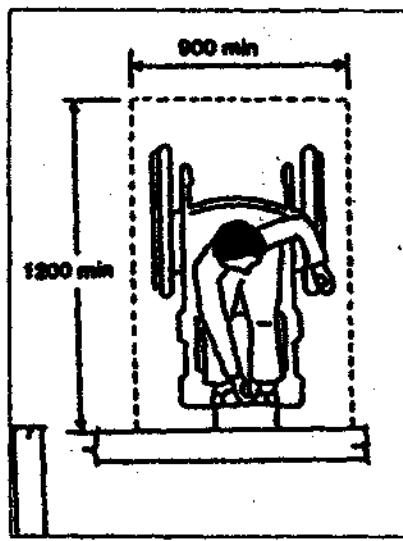
### Building Component and Spaces

#### 4.1. Space Allowances

- 4.1.1. The minimum clear floor or ground area required to accommodate a single, stationary wheel chair and occupant is 900mm x 1200mm as shown in the figure.
- 4.1.2. A minimum dear floor or ground area of 1200mm x 1200mm would allow access for both forward and side approach.
- 4.1.3. The minimum dear floor ground area dear floor ground area for a wheelchair to turn is 1500mm whereas it may be ideal to provide 1800mm.
- 4.1.4. Additional information on wheelchair dimensions are given in chapter 2



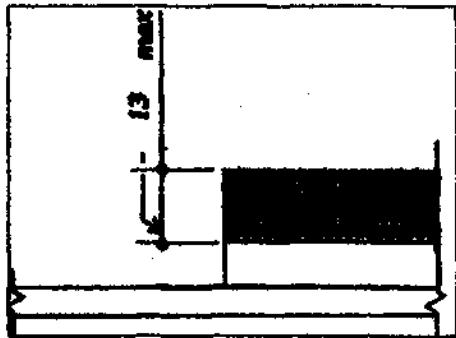
**Clear Floor Space**



**Forward Approach**

#### 4.2. Floor Surface

- 4.2.1. Floor surface should:
- be stable, firm level and slip-resistant as described in Section 12.2;
  - not have any projections, drops, or unexpected variation in levels.
- 4.2.3. Where carpets are used in circulation area, they should:
- Be securely fixed
  - Have firm cushion, pad or backing; and
  - Have exposed edges of carpets fastened to floor surface and trim along the entire length of the exposed edge complying with Table 1 (Pg 39).



### 4.3. Approaches

#### 4.3.3. Approach to building

- A passenger alighting and boarding point complying with section 7.1 should, where possible, be provided at the level of approach for the disabled to alight from and board a vehicle.
- Where transfer has to be made from a vehicular surface to a pedestrian surface, the driveway and the pavement or footway surfaces should be blended to a common level or ramped.
- Difference in level between the driveway and the pavement or footway level surface should be avoided. Where the difference is unavoidable then such drop should conform to Table 1 (Pg 39).

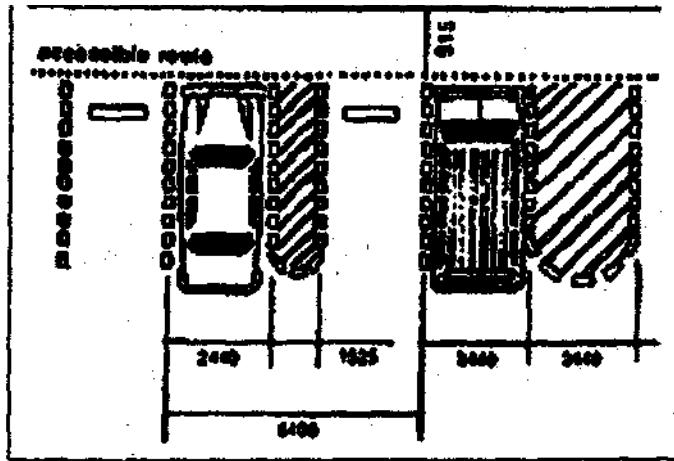
#### 4.3.2. Passenger Alighting and Boarding Point

A passenger alighting and boarding point as illustrated in the figure should:

- Provide an access aisle of at least 1500mm wide by 6000mm long adjacent and parallel to the vehicle pull-up space;
- Have a curb ramp complying with section 5.1. if there are curbs between the access aisle and the vehicle pull-up space; and
- Wherever possible, be sheltered.

#### 4.3.3 Access to Building

- The building should have at least one accessible entrance door served by an approach complying with section 4.3.
- The access should preferably be through the main entrance of the building.
- Symbol should be displayed at all other non-accessible entrances to direct people with disabilities to the accessible entrance.
- At least one accessible route leading to an accessible entrance of the building should be provided from the alighting and boarding point of taxi stands and car park tots for people with disabilities.
- The width of the accessible entrance door should not be less than 900mm and the width of the corridors or passageways leading to and from such access door should not be less than 1200mm.

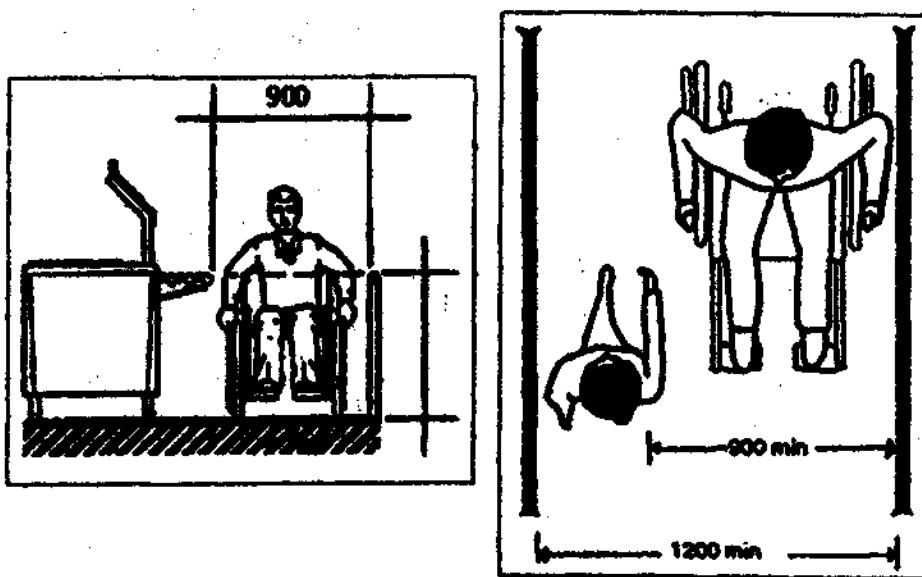


## 4.4 Accessible Routes, Corridors or Paths

### 4.4.1 Width

The minimum clear width of:

- An accessible route should be 1200mm to allow both a wheelchair and a walking person to pass as shown in the figure except when additional maneuvering space is required at doorways.
- A checkout lane should be at least 900mm as shown in the figure.
- Where space is required for two wheelchairs to pass, the minimum clear width should be 1800mm.

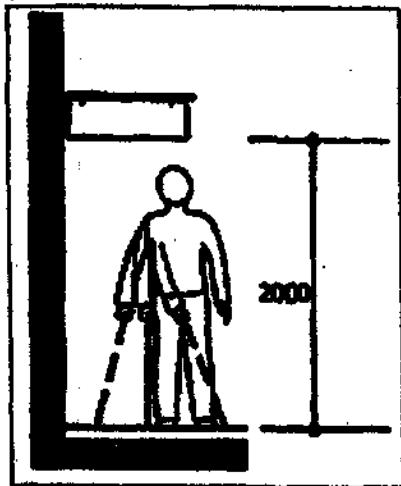


### 4.4.2 Bollard

Where bollards are erected at entrances to walkways or pathways, a minimum dear space of 900mm should be provided) between the bollards.

#### 4.4.3 Protruding Object

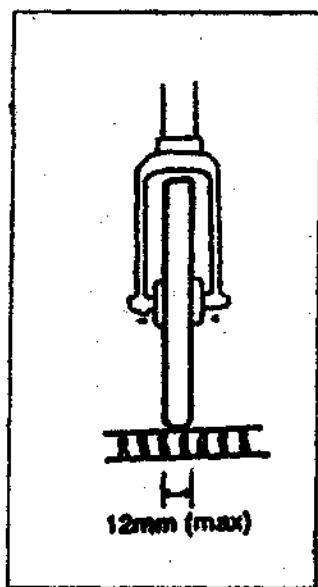
- Obstacles, projections or other protrusions should be avoided In pedestrian areas such as walkways, nails, corridors, passageways or aisles.
- Long paths of travel should be avoided and resting areas should be provided at frequent Intervals not exceeding 30 meters.
- Wherever possible, exterior walkways should be protected from the elements.



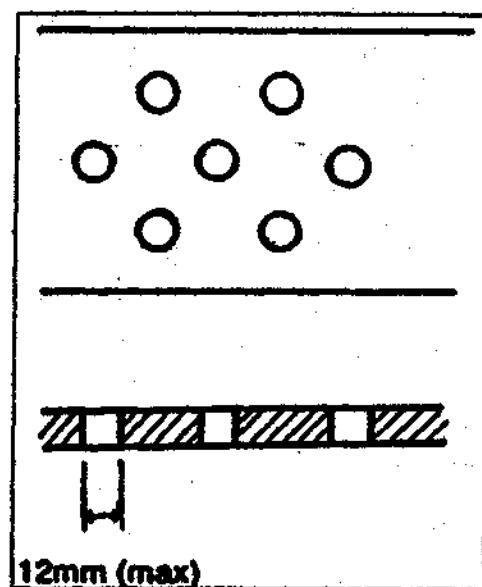
#### 4.5. Grating

Grating located along the exterior circulation should:-

- Preferably be covered;
- Have spaces not greater than 12 mm wide in one direction; and
- Have long dimension across the dominant direction of travel as illustrated in the figure.

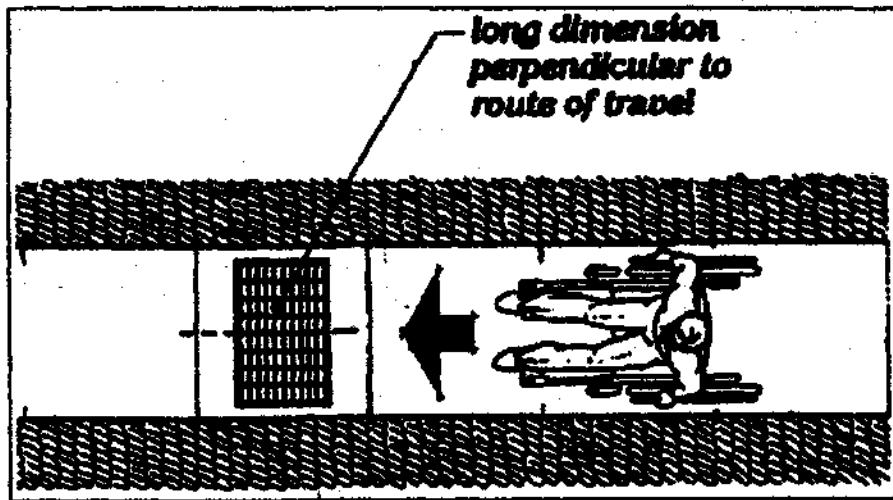


**Wheelchair Castor Width**



**Grating Width**

## Installation Guideline



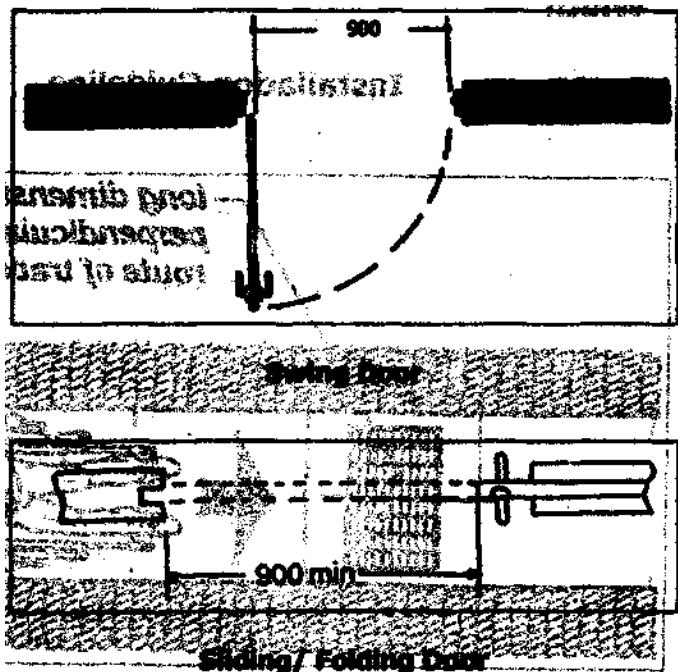
### 4.6. Doors

#### 4.6.1. General

- Doorways should be level.
- Wherever possible and practical, automatic doors - swing or sliding type - should be preferred instead of manually opening doors.
- Wherever revolving doors or turnstiles are installed they should be supplemented with an auxiliary side-hung door with minimum clear opening width of 900 mm.
- Bathroom doors should swing out so that the person inside does not fall against; the door and block it. In case there is not much space available, consideration should be given to the use of sliding or folding doors, which are easier to operate and require less wheelchair maneuvering space.

#### 4.6.2. Clear Width

The minimum clear opening of doorways should be 900mm measured between the face of the door and the face of the door stop with the door open at 90° as illustrated in figure.



#### 4.6.3. Thresholds

There should be no doorsills. If thresholds are unavoidable, they should not exceed 20 mm and preferably be beveled.

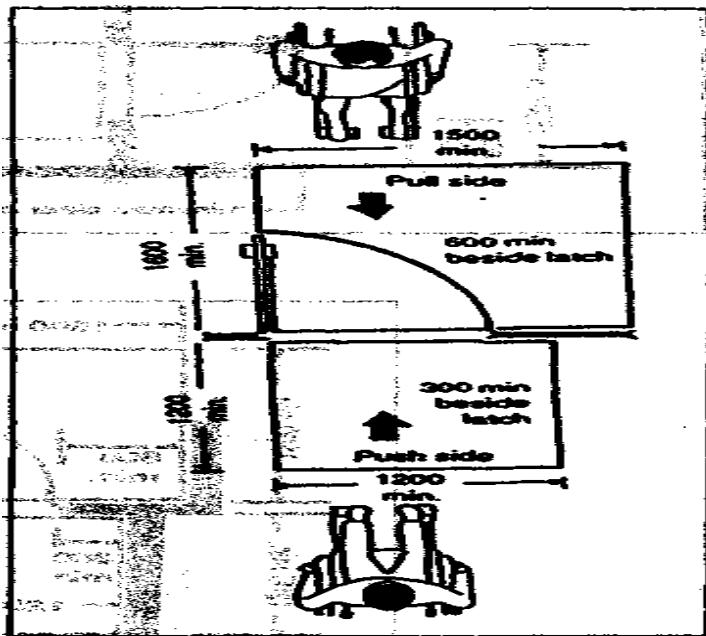
#### 4.6.4. Double- Leaf Doors

In case the door has two independently operated door leaves, at least one active leaf should comply with section 4.6.2 and 4.6.4

#### 4.6.5. Maneuvering Space at Doors

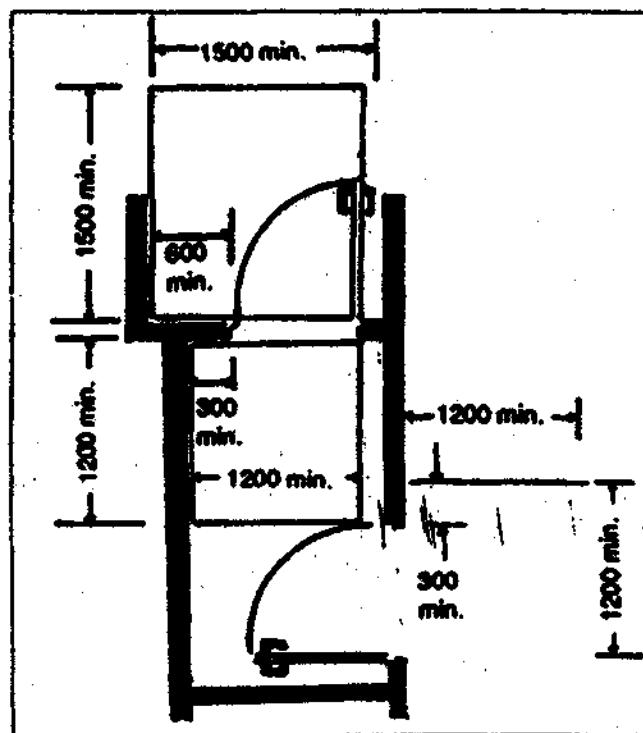
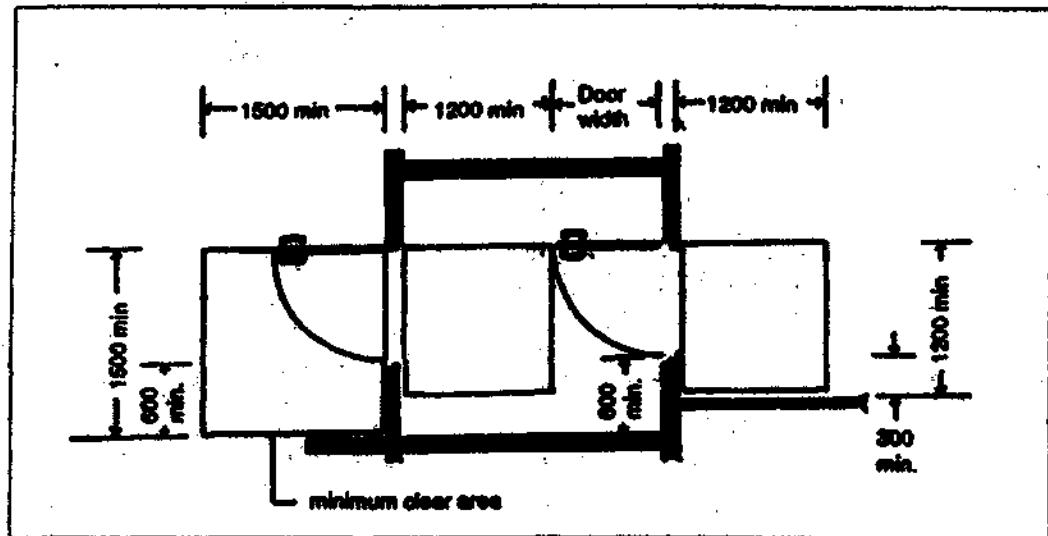
Wheelchair maneuvering spaces should be free of any obstructions and be provided on the side of the door handle in the following manner:

- On the pull side, a minimum space of 600 mm;
- On the push side, a minimum space of 300 mm;
- For two-way swing door, a minimum space of 300 mm.



#### 4.6.6. Two Doors in Series

The minimum space between two hinged or pivoted doors in series should be 1200 mm plus the width of the door swinging into that space as shown in figure.



#### 4.6.7. Door Hardware

Operable devices such as handles, pulls, latches and locks should:-

- Be operable by one hand;
- Not require fine finger control, tight grasping, pinching or twisting to operate; and
- Be mounted at a height of 900 mm to 1100 mm from the floor.

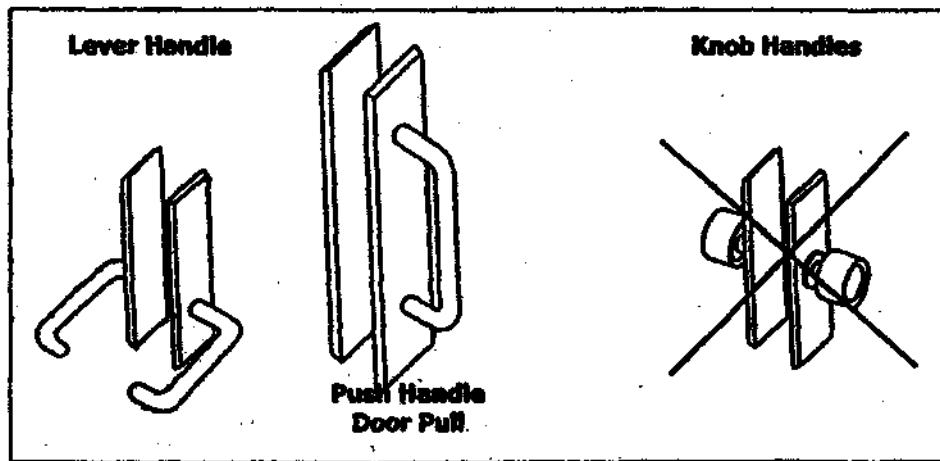
#### 4.6.8. Door Handles

The following characteristics are recommended:-

- Push-pull mechanisms that require no grasping;

- Lever handles to be preferred on latched doors;
- It is safer to use U-shaped handles as they reduce the risk of catching on clothing, or injuring from the exposed lever end.

*Doorknob Is not recommended, as it does not provide adequate grip for persons with impaired hand functions.*



#### 4.6.9. Sliding/ Folding Doors

Operating hardware should be exposed and usable from both the sides when the door is fully open.

#### 4.6.10. Door Opening Force

The maximum force for pushing or pulling a door should be: -

- 38 N for exterior hinged doors;
- 22 N for interior hinged doors; and

- 22 N for sliding or folding doors.

This section does not apply to the force required to retract latch bolts or disengage other devices that may hold &e door in a dosed position.

#### 4.6.11. Door Closure

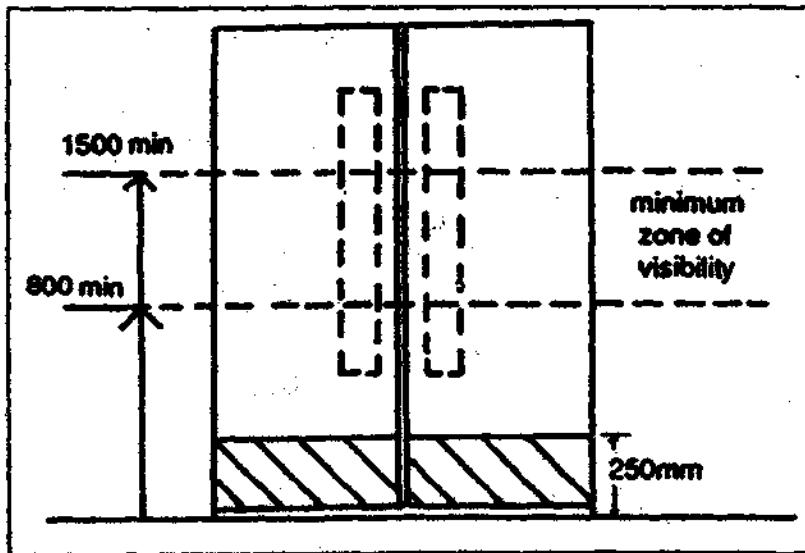
The sweep period of the door should be adjusted so that from an open position of  $90^{\circ}$  the door does not take less than 3 seconds to move to a semi- closed position of approximately  $12^{\circ}$ .

#### 4.6.12. Vision Panel

All two- way swing doors or doors in general circulation areas should be provided with vision panels giving a visibility from a height of 800 mm to 1500 mm. This will enable both the wheelchair user and the ambulatory disable to be noticed by a person on the opposite side in order to prevent him from being accidentally struck by the door.

#### 4.6.13. Kick-plate

Kick- plates of not less than 250 mm height are recommended for doors In high- use in order to protect the push side of doors from damage.



4.6.14 Wherever possible, all door should have warning blocks installed at entrances.

#### 4.7. Window

- Windows should have handles/ controls in accordance to section 4.9
- Should provide an unobstructed viewing zone for wheelchair users between 600mm and 1400mm
- Curtain or Venetian blind controls/ropes should be accessible for wheelchair users.

### 4.8. Handrail/ Grab Bar

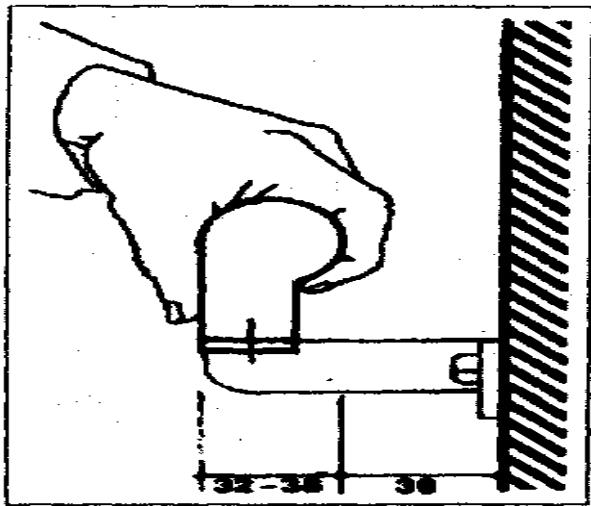
#### 4.8.1. General

- Handrails/ Grab bars are extremely important features and must be designed to be easy to grasp and to provide a firm and comfortable grip so that the hand can slide along the rail without obstruction.
- Many PWD rely upon handrails/ grab bars to maintain balance or prevent serious falls.
- Handrails may be provided with Braille/ tactile markings at the beginning and the end to give information to people with visual impairment.

#### 4.8.2. Handrail requirements

Handrails should: -

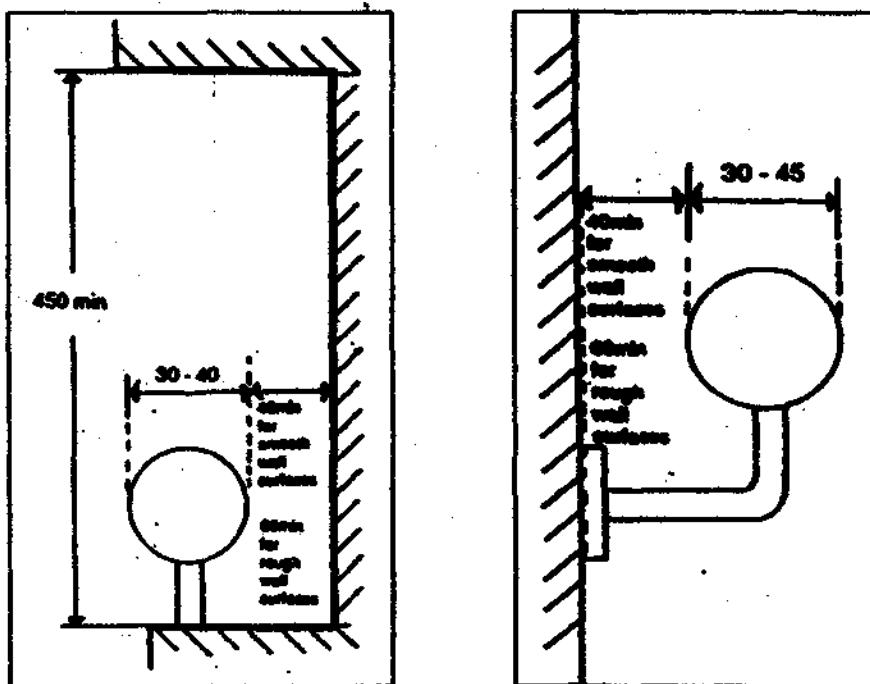
- Be slip-resistant with round ends;
- Have a circular section of 30-45mm in diameter;
- Be free of any sharp or abrasive elements;
- Have continuous gripping surfaces, without interruptions or obstructions that can break a



handhold;

- For stairs and ramps:-
- Be provided on both the sides;
- Be continuous, even at the landings; and
- Extend at least 300 mm beyond the stairs/ ramps.
- Have a minimum dear space of 40mm from the wall; and
- Be installed at a height of 800 mm to 900mm.

*In case the handrail is enclosed in a recess, the recess should extend at least 450 mm above the top of the rail.*



#### 4.8.3. Grab Bars

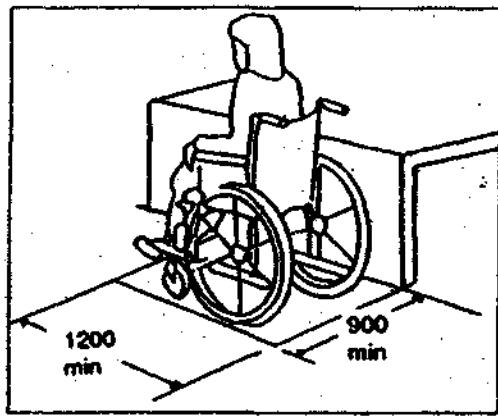
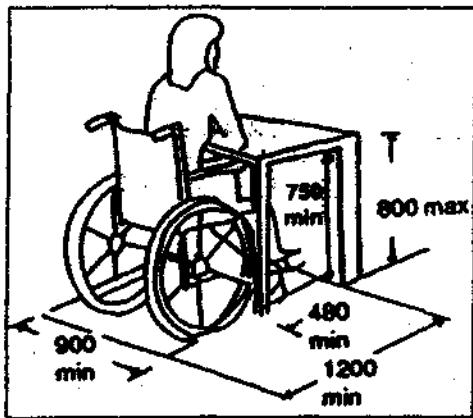
Grab bars should:-

- Be slip-resistant with round ends;
- Preferably have knurled surfaces;
- Have a circular section of 30-45 mm in diameter;
- Be free of any sharp or abrasive elements;
- Have a minimum clear space of 40mm from the wall;
- Be installed at a height of 800 mm to 900mm; and
- Resist a force of at least 1.3 N applied vertically or horizontally.-

#### **4.9. Controls and Operating Mechanisms**

##### **4.9.1. Clear Floor Space**

A clear and level floor space of at least 900 mm x 1200 mm should be provided at controls and operating mechanisms designated for use by PWD.



##### **4.9.2. Electrical Controls and Outlets**

The operable part of controls such as vending machines, electrical switches, wall sockets and intercom buttons should be: -

- Located adjacent to the clear floor space;
- Located at a height of between 600 mm to 1200 mm from the floor with the exception of vending machines where the upper limit is relax-able by a maximum of 100 mm;
- Operable by one hand;
- Of a type that does not require tight grasping, pinching or twisting of the wrist; and
- Operable with a force less than 22 N.

##### **4.9.3. Controls**

**4.9.3.1.** Faucets and other controls designated for use by PWD should be hand-operated or electronically controlled.

**4.9.3.2.** Hand-operated controls should:-

- Be operable by one hand;
- Require no tight grasping, pinching or twisting of the wrist; and
- Require a force less than 22 N to activate;
- Have handles of lever type (not self-closing) operable with a closed fist.

## 4.10. Seating Spaces

### 4.10.1. Clear Floor Space

Seating space, such as those provided at counters, tables, or work surfaces for persons in wheelchairs should have a dear and level floor space of not less than 900 mm x 1200 mm.

### 4.10.2. Clear Knee Space

Where a forward approach is used, a clear knee space of at least 900 mm wide, 480 mm deep and 750 mm high should be provided, which may overlap the clear floor space by a maximum of 480 mm as illustrated in the figure.

### 4.10.3. Counter Tops

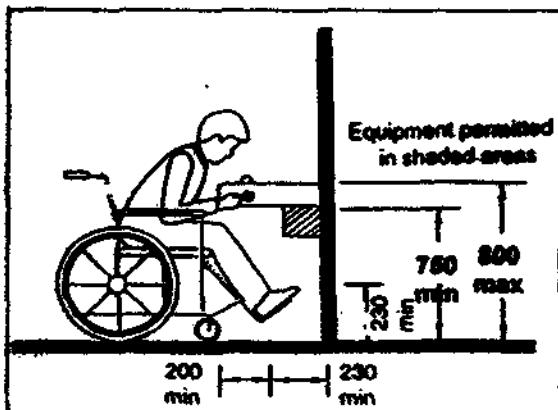
Writing surfaces or service counters should not be more than 800 mm from the floor.

## 4.11. Other Facilities

### 4.11.1. Drinking Water Outlet

The water outlet should have:

- Controls complying with section 4.93.
- Drinking water coolers or taps should:
- Have a clear floor space of at least 750mm x 1200mm as shown in the figure

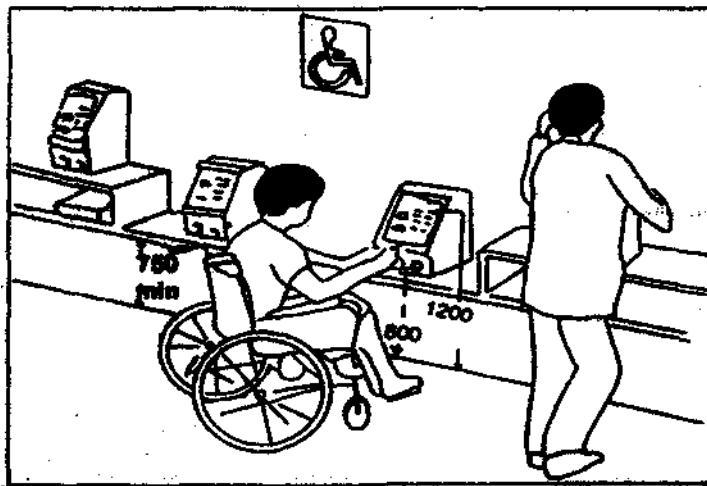


- Have a clear knee space between the bottom of the apron and floor or ground of at least 750mm wide, 200mm deep and 750mm high; and
- Have a toe space not less than 750mm wide, 230mm high as shown in the figure
- Have a water glass provision
- Freestanding or built -in-drinking water coolers or taps not having a knee space should have a clear floor space of at least 1200mm wide x 750mm in front of the unit as shown in the figure.
- *All wall-mounted drinking water provision in an alcove is preferred, because it does not create a hazard for persons with visual impairments. Drinking water cooler/taps that extend into corridors and have an open space underneath the fountain 750mm in height should be protected by a wall guard. The provision of two drinking facilities at different heights is very convenient for standing adults, people in wheelchairs and children. The 100mm high water flow is to allow for the insertion of a cup or glass.*

#### 4.11.2 Public Telephone

##### 4.11.2.1 General

- Where payphones are provided, at least one payphone should be made accessible.
- A seat adjacent to the payphone is recommended for the ambulant disabled but should not impede the approach by the wheelchair user to the telephone.



##### 4.11.2.2 Clear Foot Space

A dear foot space of not less than 900mm by 1200mm should be provided in front of the telephone booth or counter.

##### 4.11.2.3 Counter Top

- Counter tops, where provided, should be between 750mm and 800mm from the floor and have a minimum dear knee space of 750mm
- The depth of the counter top should be not less than 480mm as shown in the figure.

##### 4.11.2.4 Telephone Booth

- The opening of the telephone booth should have a clear width of at least 870mm
- The enclosed space should have dimensions of at least 870mm by 1000mm that should not be restricted by fixed seats as shown in the figure.

##### 4.11.2.5 Height

The height of all operable parts of the telephone should be between 800mm and 1200mm

##### 4.11.2.6. Telephone Cord

The minimum length of the cord should be 900mm

##### 4.11.2.7. Telephone Books

Telephone books, if provided, should be located within the reach of a wheelchair user.

##### 4.11.2.8. Signage

The Symbol should be displayed to identify the location of such telephones.

#### 4.11.3 Mailbox

- The mail slot should be located at the height of maximum 1200mm
- It should have a clear floor space

#### 4.11.4 Vending Machine

- The coin slot must be located at height of 1200mm or less
- It should have a dear floor space
- Operating buttons should be in raised numbers and in contrasting colours

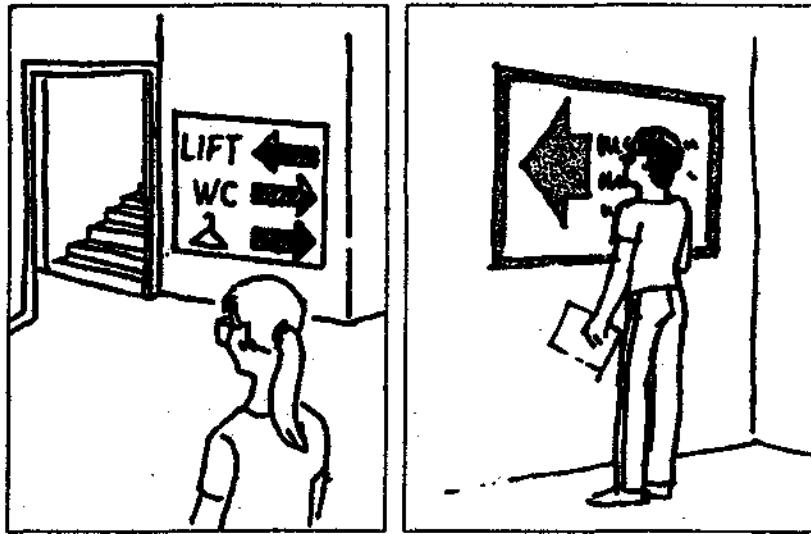
#### 4.11.5 ATM- Money Machine

- It should have a clear floor space
- Should have a dear knee space
- Control buttons should be between 900mm and 1200mm height from the floor
- Control buttons should be in raised numbers and in contrasting colours.

### 4.12 Signage

#### 4.12.1 General

- The main purpose of signs should be to provide a clear designation of places, warnings and routing information.
- Where the building is designed in compliance with this guide, the attention of all users should be drawn to the facilities in order that the people with disabilities are made aware of the existence of suitable provisions for them. The Symbol of Access should be permanently and conspicuously displayed to indicate the location of the various facilities in the building.
- *Refer to annexure for details on the International Symbol of Access.*



- Signs should be useful for everyone, easily seen from eye level, readable by moving the fingers and well lighted for night time identification.
- Signs should indicate the direction and name of the accessible facility and incorporate

the Symbol of Access.

- Size, type and layout of lettering on signs should be clear and legible.

#### 4.12.2 Specifications

4.12.2.1 A *person on* a wheelchair is less than 1200 mm high. The acceptable zone for notices/ signs exclusively for wheelchair users should be between 750 mm and 1200 mm.

4.12.2.2 Acceptable zone for installing wall/ door signs for standing users, e.g. people with visual disabilities and people with ambulatory disabilities, should be between 1200 mm and 1350 mm from the floor level.

4.12.2.3 A minimum clearance of 2000:mm height from the floor level should be provided for suspended or projecting signs.

4.12.2.4 Disabled persons may have limitations in the movement of their head, or a reduction in peripheral vision.

- Signs positioned perpendicular to the path of travel are easiest for them to notice.

- Persons can generally distinguish signs within an angle of 30° to either side of the centerline of their faces without moving their heads.

4.12.2.5 Signs should be in contrasting colour and preferably be embossed in distinct relief to allow people with visual impairments to obtain the information by touching them.

4.12.2.6 Audible signs should be installed in dangerous areas for the aid of people with visual impairments.

4.12.2.7 The size of the characters and symbols should be based on the intended viewing distance and determined in accordance with table 2 (page 39).

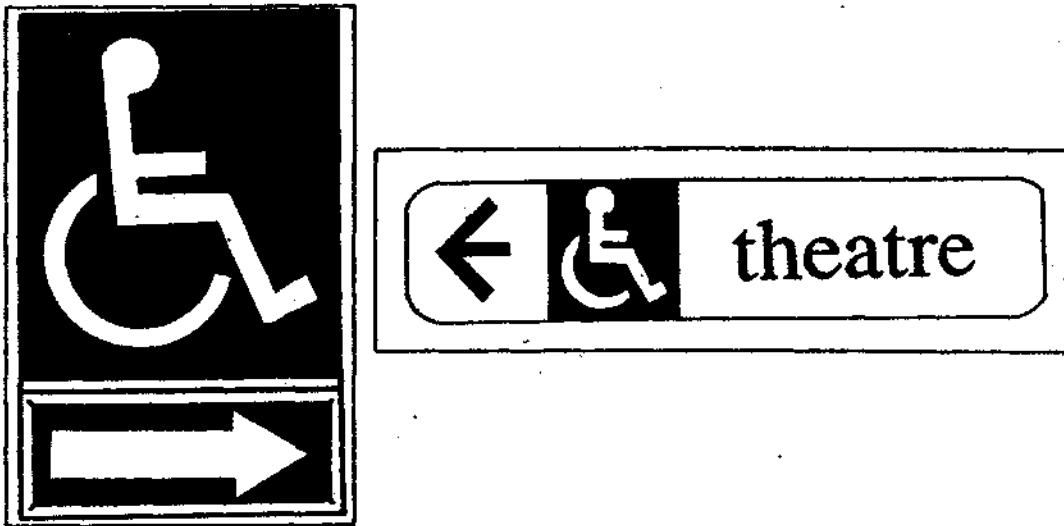
4.12.2.8 Height of the letters in the signs for varying viewing distances should be determined in accordance to table 3 (page 39).

#### 4.12.3 Directional Signs

4.12.3.1 Directional signs as shown in the figure should be displayed at main lobbies or passageways and at points where there is a change of direction, to direct people with disabilities, to the various facilities such

as lifts, entrances, telephone booths, toilets, car park, etc.

4.12.3.2 Where the location of the designated facility is not obvious or is distant from the approach viewpoints, directional signs as shown in the figure should be placed along the route.



#### 4.12.4 Service Identification Signs

The Symbol as shown in the figure should be displayed at various facilities for people with disabilities such as lifts, entrances, telephone booths, toilets, car parks and the like.



#### 4.13 Reference Tables

**Table 1: Changes in Level**

Vertical rises(mm)	Maximum Gradient
0.0 to 15.0	1:2
15.1 to 50.0	1:5
50.1 to 200	1: 10
Exceeding 200	1: 12

**Table 2: Size of Signs**

Viewing Distance	size
Up to 7 mm	60 mm x 60 mm
7 mm - 8 mm	100 mm x 100 mm
Exceeding 8 mm	200 mm x 200 mm to 450 mm x 450 mm

**Table 3: Size of Letters in Signs**

<b>Viewing Distance</b>	<b>Height of letters</b>
2000 mm	6 mm
3000 mm	12 mm
6000 mm	20 mm
8000 mm	25 mm
2000 mm	40 mm
15000 mm	50 mm
25000 mm	80 mm
35000 mm	100 mm
40000 mm	130 mm
50000 mm	150 mm

## **Chapter 5**

### **Changes in Levels**

#### **5.1. Curb Ramp**

##### **5.1.1. General**

Curb ramps: -

- are provided where the vertical rise is less than 150 mm;
- should have a slip-resistant surface;
- should be designed not to allow water accumulating on the walking surface;
- do not require handrails;
- should not project into the road surface;
- should be located or protected to prevent obstruction by parked vehicles; and
- should be free from any obstruction such as signposts, traffic lights, etc.

##### **5.1.2. Gradient**

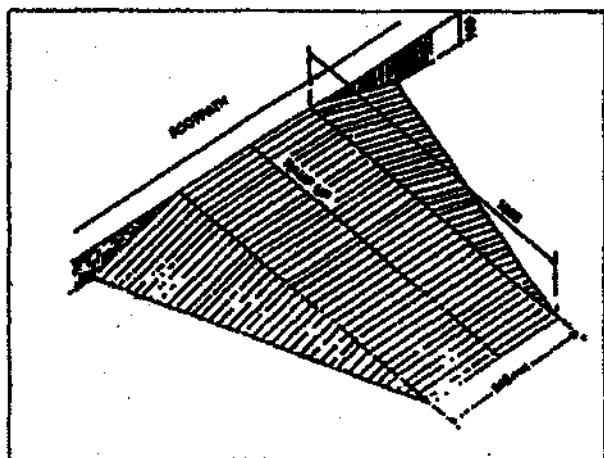
The gradient of a curb ramp should not be steeper than 1:10.

##### **5.1.3. Width**

The width should not be less than 900 mm.

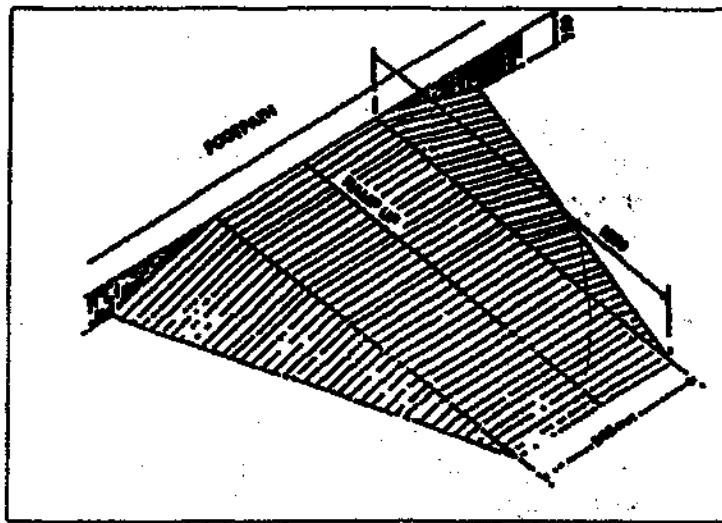
##### **5.1.4. Flared Sides**

- Curb ramps should have flared sides where pedestrians are likely to walk across them as shown in the figure; and
- The gradient of the flared side should not be steeper than 1:10.



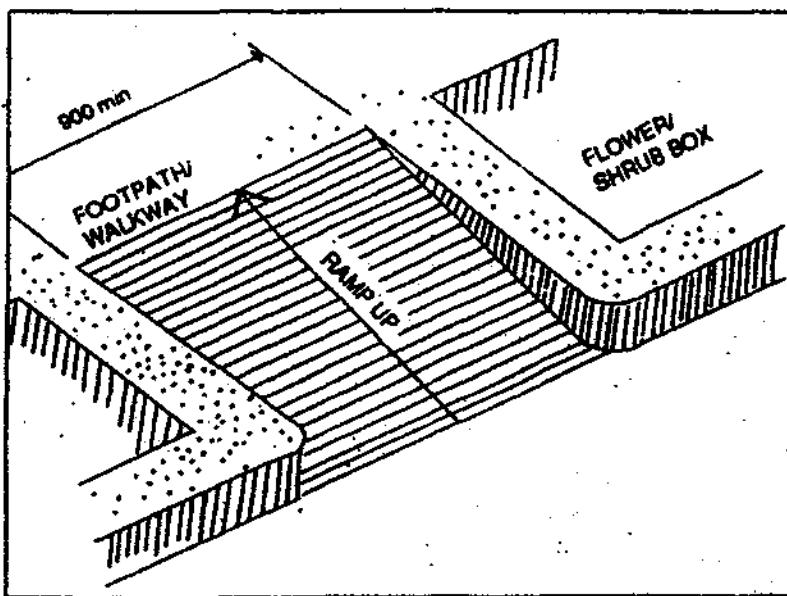
##### **5.1.5. Built-up/Extended Curbs**

These should not be used if they project into a roadway, as it is dangerous for users and obstructive for vehicles.



#### 5.1.6. Returned/Continuous Curb

Curb ramps with returned/ continuous curb are an alternative approach that may be used where pedestrians will not be expected to walk across the ramp



#### 5.1.7. Warning blocks

Warning blocks should be Installed at the end of the curb ramp to aid people with visual impairments.

*Where the vertical rise is greater than 150 mm, it should constitute a slope ramp and should comply with section 5.2*

### 5.2. Slope Ramp

#### 5.2.1. General

- Ramps allow persons in wheelchair to move from one level to another. However, many ambulant persons with disabilities negotiate steps more easily and safely. Hence it is preferable to provide accessibility by both steps and ramps. 'o Where the horizontal run of the approach ramp exceeds 9000 mm in length, an alternative stepped approach as described in section 5.3, in addition to the ramp approach, should be provided for people with ambulatory disabilities.
- Where there is a large change in elevation that requires multiple ramps and landing combination, other solutions such as elevators should be considered.

#### 5.2.2. Gradient

Gradient of a ramp should: -

- Not be steeper than 1:12 (complying with table 1, Pg. 39); and
- Be constant between landings.

#### 5.2.3. Width

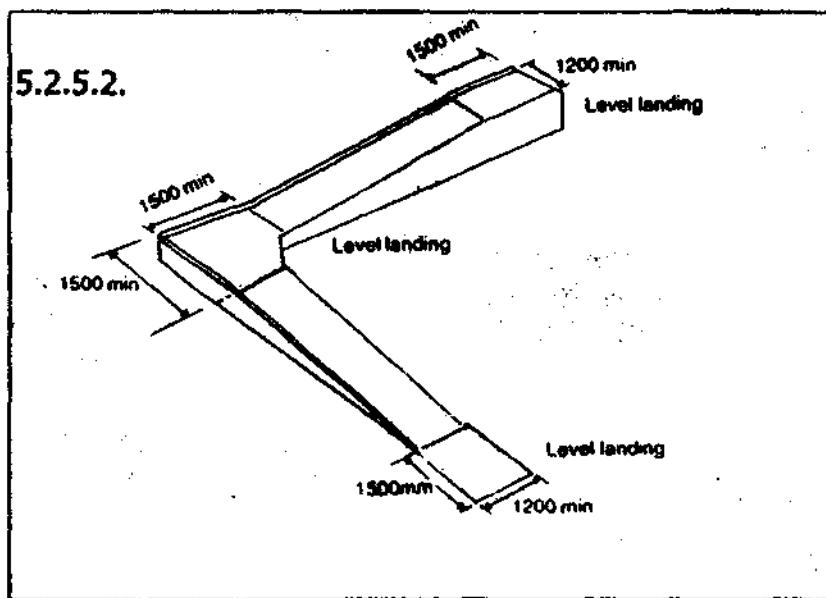
The minimum clear width of a ramp should be 1200 mm.

#### 5.2.4. Surface

- Ramps and landing surfaces should be slip resistant as described in the annexure; and
- Outdoor ramps and their surfaces should be designed to prevent water from accumulating on the walking surfaces.

#### 5.2.5. Landings

- 5.2.5.1. Ramps should have a level landing at the top and bottom of each run and also where the run changes direction as shown In the figure.



#### 5.2.5.3. Landings should:-

- Be provided at regular intervals of not more than 9000 mm of every horizontal run as shown in the figure;

- Have a level platform of not less than 1500 mm; and
- Conform to section 4.6.5 if served by a doorway.

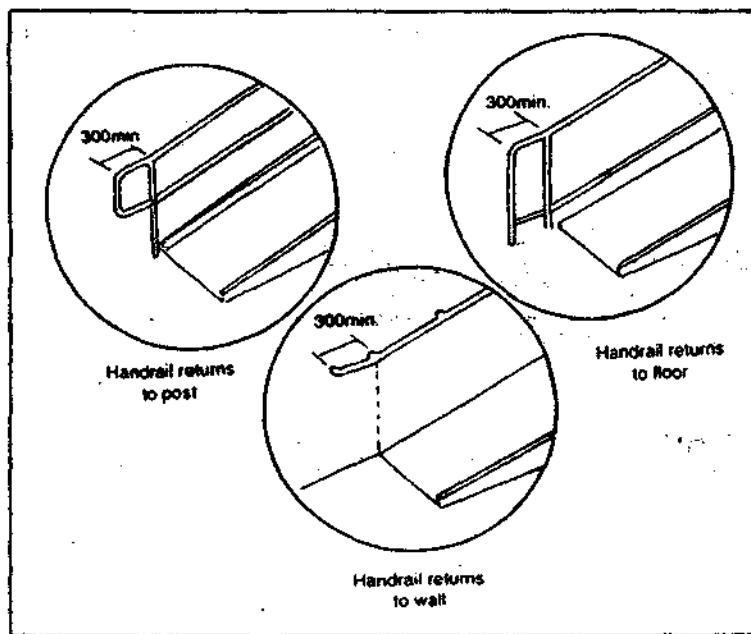
#### 5.2.6. Handrails

5.2.6.1. A ramp run with a vertical rise greater than 150 mm should have handrails that:-

- Are on both the sides;
- Comply with section 4.8; and
- Are placed at a height of between 800 mm and 900 mm above the floor level.

5.2.6.2. Handrail extensions as shown in the figure should:-

- Extend horizontally for a distance of not less than 300 mm beyond the top and bottom of the ramp to provide support for persons who may need help to negotiate the ramp; and
- Not project into another path of travel.



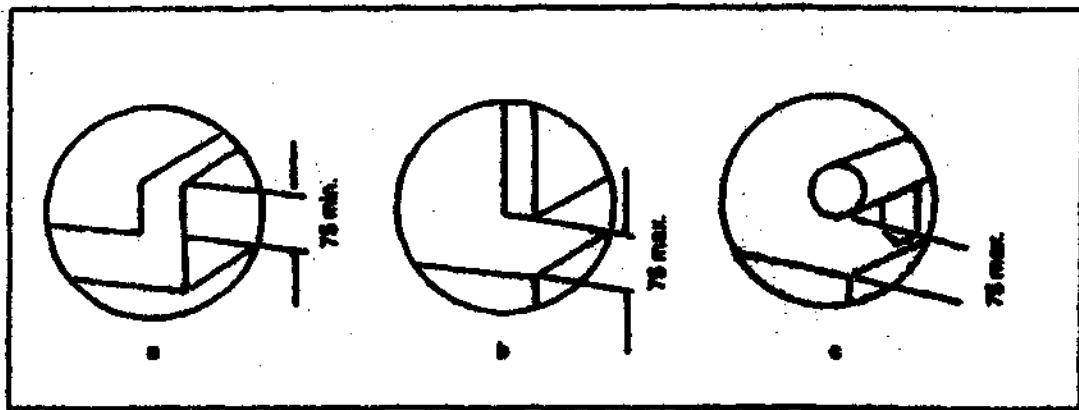
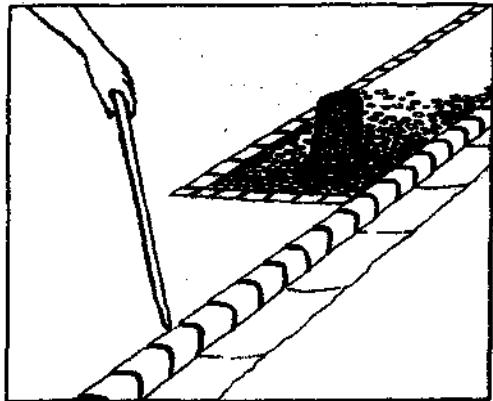
#### 5.2.7. Edge Protection

Ramps and landings not adjacent to a wall should have an edge protection such as: -

5.2.7.1 A curb with a minimum height of 75 mm as shown in the figure;

5.2.7.2. A raised barrier with its lower edge not more than 75 mm from the ramp or landing surface as shown I the figure; or

5.2.7.3. A rail with the bottom edge not more than 75 mm from the ramp or landing surface as shown in the figure.



#### 5.2.8. Warning blocks

Warning blocks may be installed at the beginning and end of the ramp to aid people with visual Impairments.

### 5.3. Stairs

5.3.1. In public buildings, at least one of the staircases should be designed to comply with sections 5.3.2 to 5.3.5

#### 5.3.2. Tread and Riser

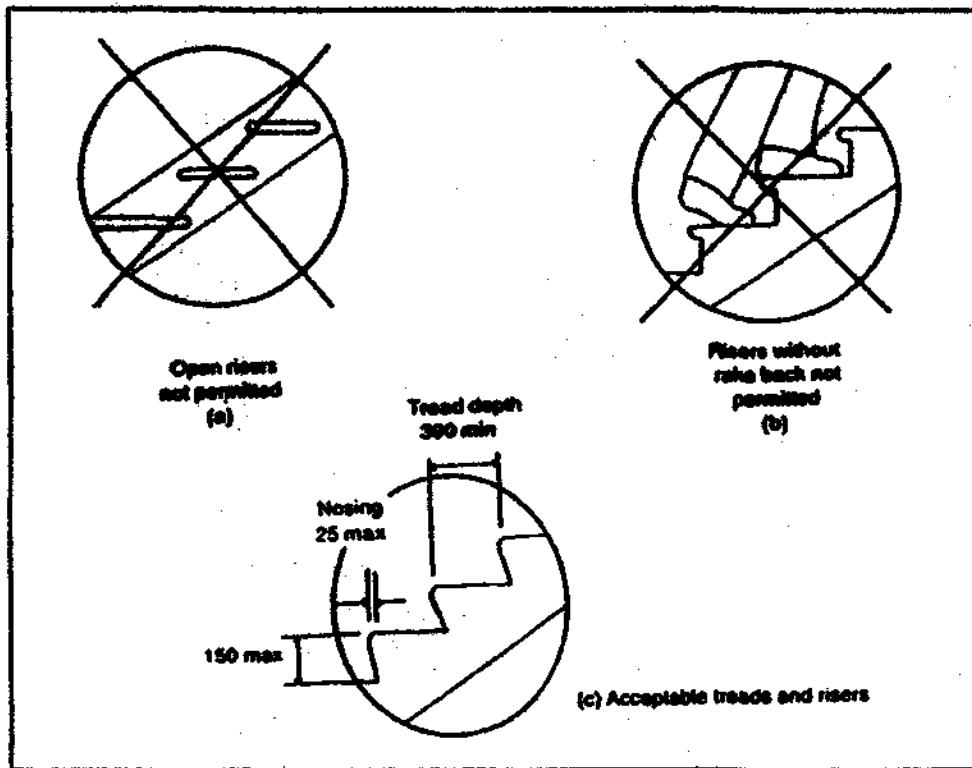
A flight of steps should have: -

- uniform riser of maximum 150 mm and tread of 300 mm; and
- no open riser as shown in the figure, open riser are hazardous for everyone as the leg can get stuck under the tread.

#### 5.3.3. Nosing

Nosing should: -

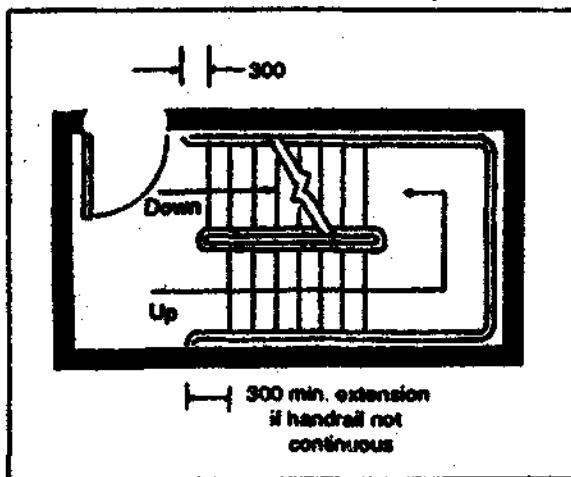
- Have no abrupt undersides as shown in the figure;
- Project not more than 25 mm over the back edge of the step as shown in the figure; and
- Preferably be in a contrasting color from the background to aid people with tow vision.



#### 5.3.4. Handrail

Handrail for stairs should: -

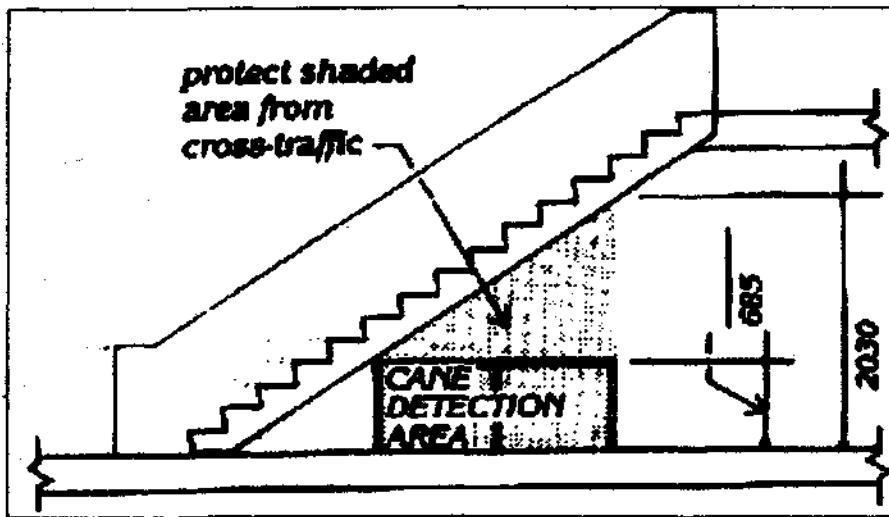
- Comply with section 4.8;
- Be installed on both the sides as shown in the figure;
- Have their tops between 800 mm and 900 mm from the stair nosing;
- Be continuous throughout the entire length; and
- Extend not less than 300 mm beyond the top and bottom step as shown in the figure.



#### 5.3.5. Warning blocks

Warning blocks should be installed at the beginning and at the end of each flight of steps

to aid people with visual impairments.



## 5.4. Lift

### 5.4.1. General

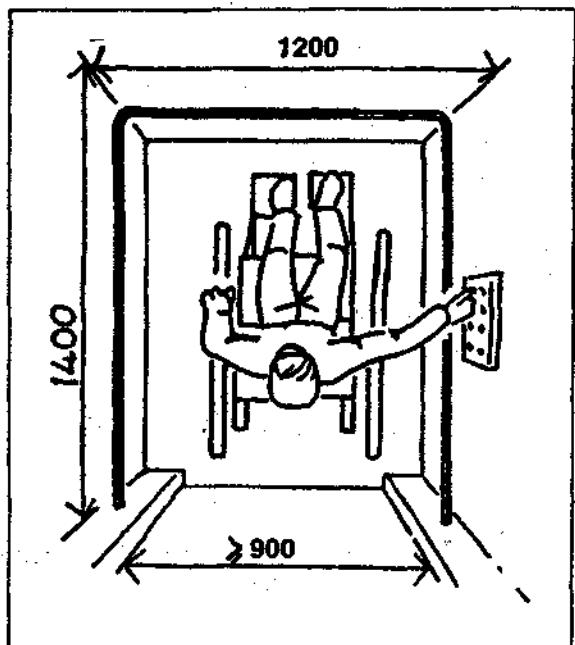
5.4.1.1. Where lifts are provided in a building, at least one lift should be made accessible from the entrance level for vertical circulation.

5.4.1.2. The lift should serve all levels intended for access by people with disabilities.

5.4.1.3. Lifts designated for use by people with disabilities should be marked with proper signage and directional signs be provided from all other entrances of the building to the accessible lift.

### 5.4.2. Lift Size

The minimum size of the lift should be 1200 mm wide by 1400mm deep.



#### 5.4.3. Door

- 5.4.3.1. The lift door should have a clear opening of not less than 900 mm.
- 5.4.3.2. There should be no gap or difference in level between the lift door and the floor surface at each level. If such a gap is unavoidable, then it should not be more than 12 mm.

#### 5.4.4. Call Button

The call button located outside the lift should: -

- Have a clear floor space of at least 900 mm x 1200 mm with no obstruction placed to prevent a wheelchair user from reaching the call button; and
- Be installed at a height between 900 mm and 1200 mm.

#### 5.4.5. Control Panel

The control panel should: -

- Have a dear floor space of at least 900 mm x 1200 mm with no obstruction placed to prevent a wheelchair user from reaching it;
- Be placed at a height of between 900 mm and 1200 mm from the floor level; and
- Have buttons with Braille/raised letters and in sharp contrast from the background to aid people with visual impairments.

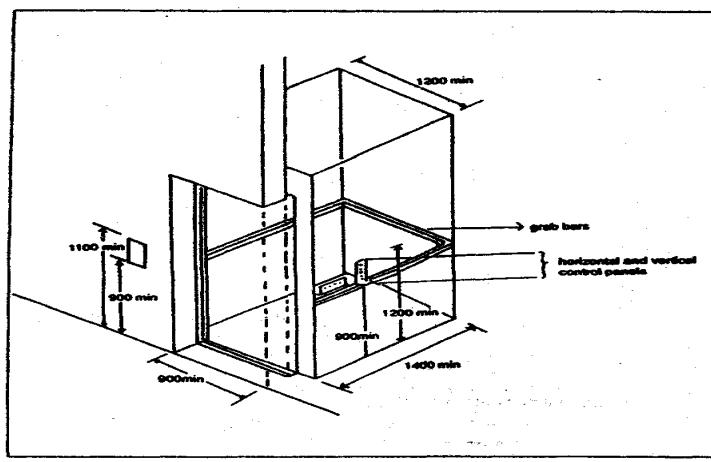
#### 5.4.6. Grab Bars

Grab bars should: -

- Comply with section 4.8;
- Be placed at a height of 900 mm from the floor level; and
- Be fixed on both sides and at the rear of the lift.

#### 5.4.7. Audio and Visual Indicators

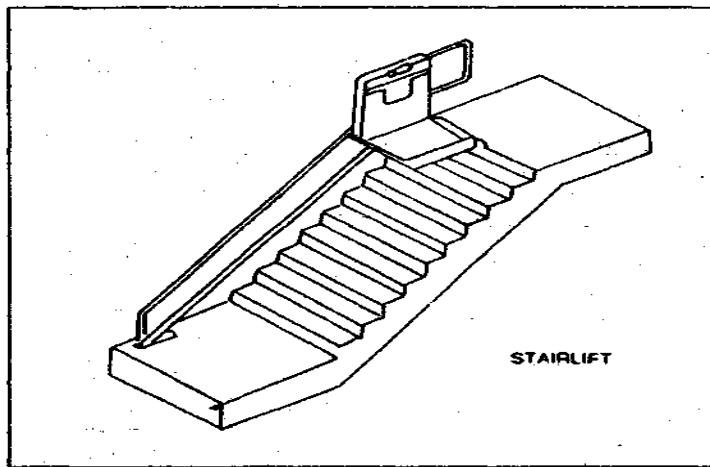
The lift should have a voice announcement system along with a visual display to indicate the floor level.



Elevator Dimensions

## 5.5. Wheelchair Stair-lift and Platform Lift

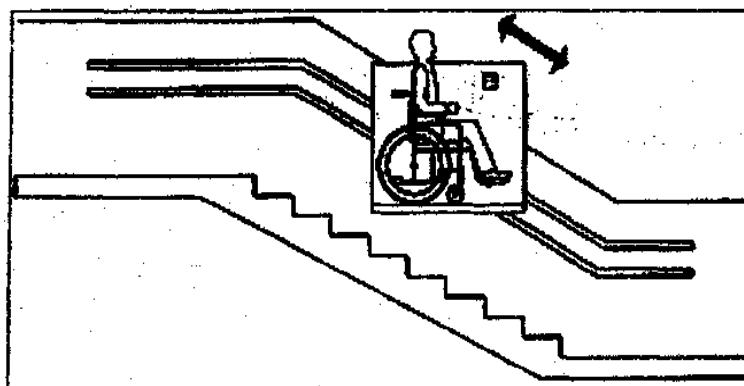
Where it is impracticable to provide a lift or a ramp, a wheelchair stair-lift or platform lift, as shown in the figure, should be considered as a reasonable alternative for vertical circulation within the building.



### 5.5.1. General

- Platform lifts are special passenger elevating devices for people with disabilities.
- Platform lifts can have either a vertical or an inclined movement.

### 5.5.2. Vertical Movement Platform Lifts

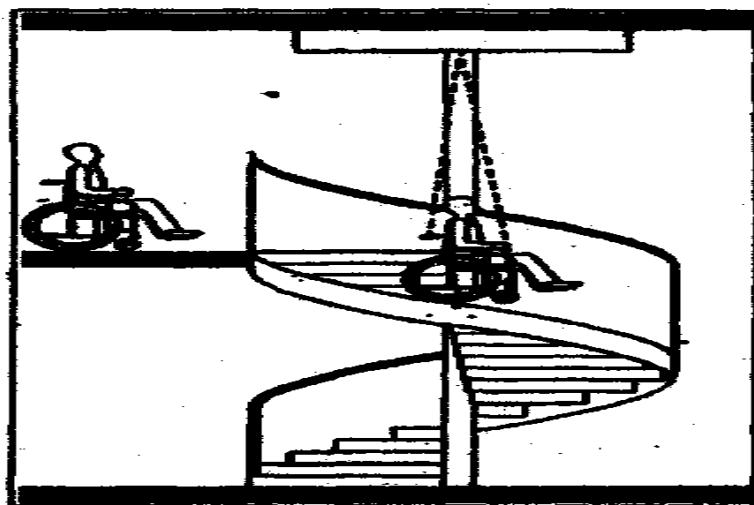


- For maximum level changes of 2500 mm, vertical movement platform lifts may be installed,
- For level changes of more than 1200 mm, the lift should be placed in a dosed structure with doors at different accessible levels.
- o Vertical platform lifts can have a variety of openings for entry and exit.

### 5.5.3. Inclined Movement Platform Lifts

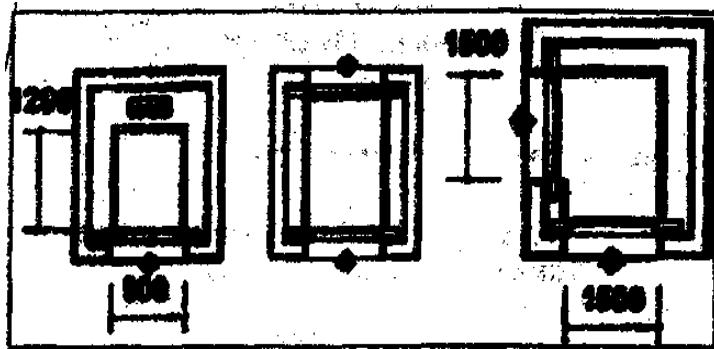
- Inclined movement platform lifts consist of three elements: a railing, an electric generator, and a moving platform or seat.
- The operating system of the lift may be lateral or suspended.

- Inclined movement platform lifts can be installed along the stair wall, as long as they do not obstruct the required width of the exit. The seat or platform can be folded when not in use.
- The minimum width of the stairs should be 900 mm to allow the installation of a lift.
- Platform lifts can be installed on all types of stairs including switchback stairs i.e. those with a rotation angle of 180° end spiral staircases.
- Inclined movement platform lifts are usually used to connect one or more floors or to overcome split-levels in existing buildings.



#### 5.5.4. Lift Size

The minimum width of the platform lift should be 900 mm and the minimum length should be 1200 mm.



## **Chapter 6**

### **Access to Toilet Facility**

#### **6.1 General Provision**

6.1.1. Signage at washroom entrance should be clearly visible and should comply with the Symbol of Access as described in annexure.

6.1.2. At every level of the building where toilets are required to be provided, at least:

- One individual accessible washroom for the wheelchair users should be provided for both the male and the female; or
- One accessible toilet cubicle for wheelchair users shall be provided in both the male and the female toilets.

6.1.3. Where two or more clusters of toilets are provided at the same level but at different locations, the corresponding number of accessible washrooms or toilet cubicles should be provided.

6.1.4. At least one wash basin in the toilet should comply with the section 6.8

6.1.5. Where washroom accessories are provided, at least one of each type should be made usable to the wheelchair user in accordance to the section 6.9

6.1.6. Where urinals are provided, at least one should comply with section 6.10 to cater to the ambulant disabled.

6.1.7. Installation of a separate unisex unit is always desirable in public buildings, even when all washrooms are accessible, so as to allow a person with disability to be assisted by an attendant of the opposite sex.

#### **6.2 Individual Washroom**

Where an individual washroom for the wheelchair user is provided, it should:-

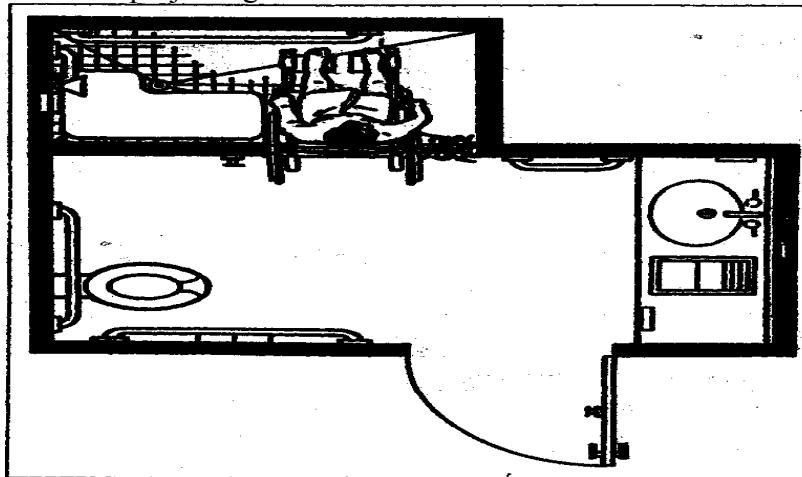
- Have minimum internal dimensions of 1750 mm x 1750 mm;
- Have clear space of not less than 900 mm wide next to the water closet;
- Be equipped with a door complying with section 6.5;
- Have a water closet complying with section 6.6;
- Have grab bars complying with section 6.7;
- Have a wash basin complying with section 6.8;
- Have essential washroom accessories complying with section 6.9;
- Have the toilet roll dispenser mounted below the grab bars and at not more than 300 mm from the front edge of the seat and at a height between 50 mm and 250 mm from the top of the water closet seat;
- Be equipped with a cloth hook mounted on a side wall not more than 1300 mm from the

- floor and projecting not more than 40 mm from the wall; and
- Where possible, be equipped with a shelf of dimensions 400 mm x 200 mm fixed at a height of between 900 mm and 1100 mm from the floor.
  - *People with different disabilities, including person with an attendant or parent with a disabled child use an Individual washroom.*
  - *It may be desirable to equip this type of washroom with an emergency call switch that activates an alarm.*

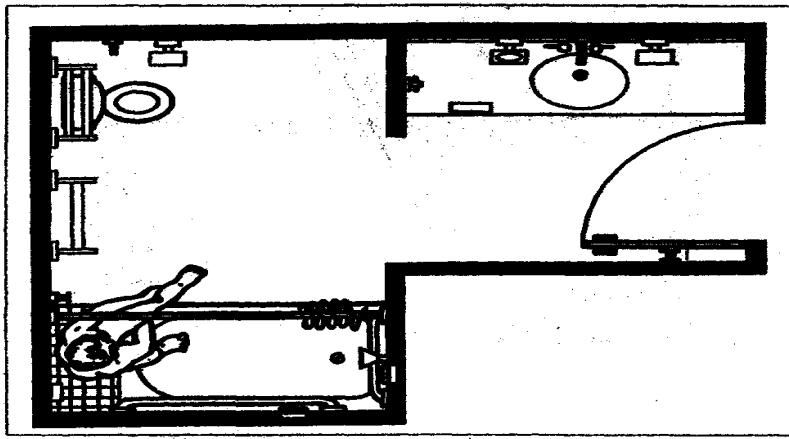
### **6.3 Toilet Cubicle for Wheelchair User**

Where a toilet cubicle for the wheelchair user is provided, it should: -

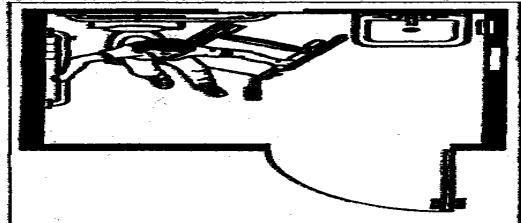
- Have clear internal dimensions of not less than 1500 mm x 1750 mm;
- Be equipped with a door complying with section 6.5;
- Have a water closet complying with section 6.6;
- Have grab bars complying with section 6.7;
- Have the toilet rod dispenser mounted below the grab bars and at not more than 300 mm from the front edge of the seat and at a height between 50 mm and 250 mm from the top of the water closet seat; and
- Be equipped with a cloth hook mounted on a side wall not more than 1300 mm from the floor and projecting not more than 40 mm from the wall.



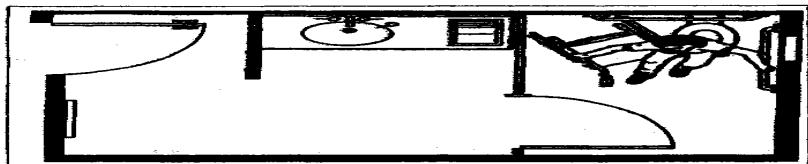
**Layout Plan of an Individual Washroom  
With Shower Cubicle**



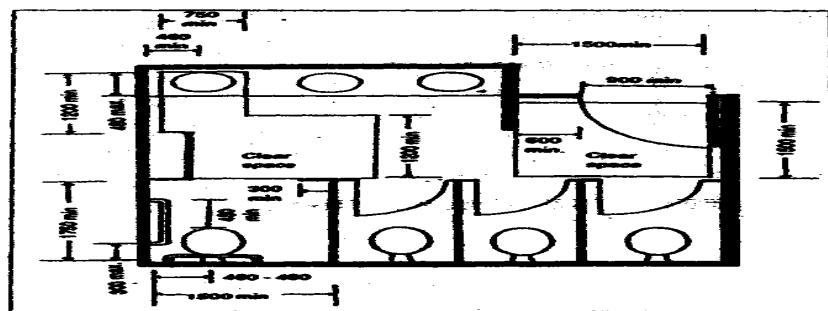
**Layout Plan of an Individual Washroom  
With Bathtub**



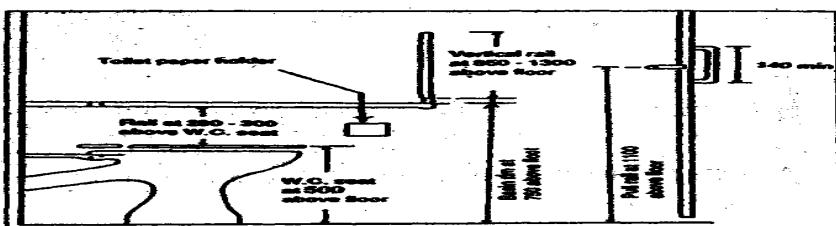
**Layout Plan of Toilet Cubicle**



**Layout Plan of Toilet Cubicle with Compartment**



**Layout Plan for Public Toilets**

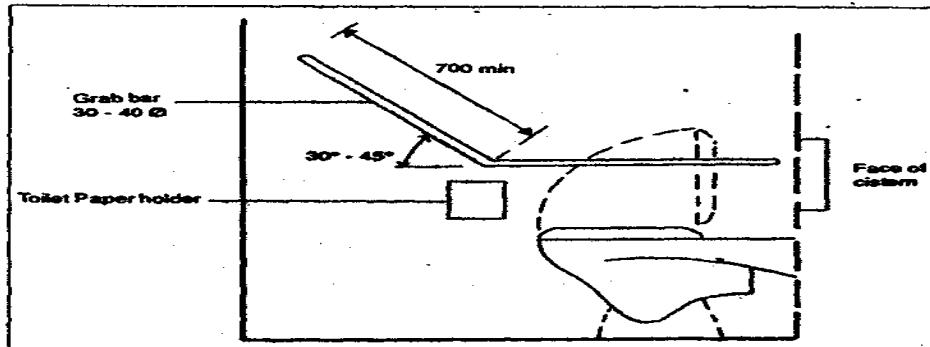


**Side View of a Toilet Cubicle**

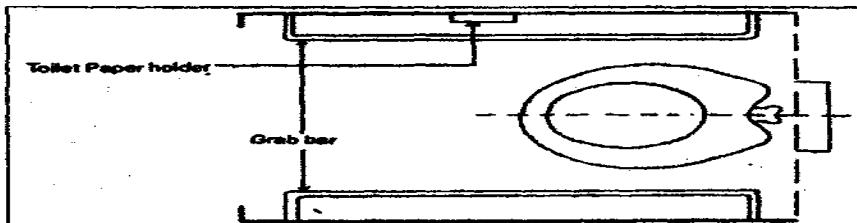
#### **6.4 Toilet cubicle for ambulatory disabled**

Where provided, it should: -

- Have internal dimensions of a standard cubicle;
- Have grab bars on both the sides of the cubicle to act as handhold for the person with ambulatory disability to stand; and
- Be equipped with a door complying with section 6.5.
- Toilet cubicle for person with ambulatory disability is not suitable for the wheelchair user unless the grab bar on the transfer side is a swing-up or swing-away type.



**Alternative Plan of Toilet Cubicle for Ambulant Disabled**



#### **6.5 Washroom and Toilet Cubicle boor**

Washroom and toilet cubicle doors should: -

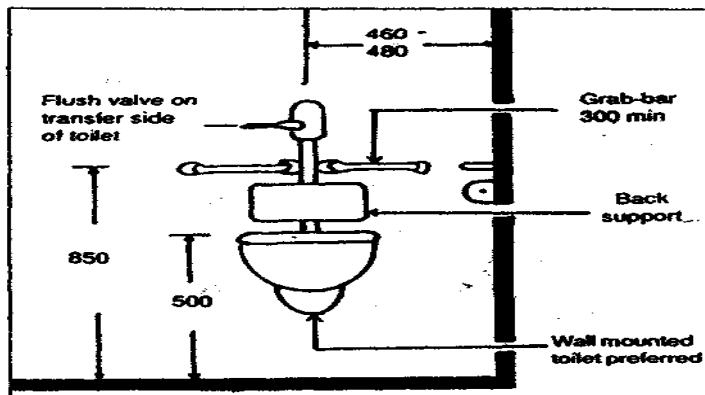
- Provide a clear opening of at least 900 mm with the door in fully open position in accordance to section 4.6;
- Swing outwards or be sliding or folding type;
- Be provided with a horizontal pull-bar, at least 600 mm long, on the inside of the door, located so that the end closer to the hinge is 130 mm from the hinged side of the door and at a height of 1100 mm as shown in the figure;
- Be provided with a vertical/ horizontal pull-bar, at least 140 mm long, on the outside of the door, near the latch side of the door and at a height of 1100 mm as shown in the figure;
- Be provided with spring-type or gravity hinges so that the door closes automatically; and
- Be capable of being locked from the inside by a device that is operable by one hand, activated by a force not more than 22 N and which does not require: -
  - fine finger control,
  - tight grasping, and

- pinching or twisting of the wrist.
- *Doors should be lockable from inside and releasable from outside under emergency situations.*

## 6.6 Water Closet

Water closet should comply with the following requirements: -

- Be located between 460 mm to 480 mm from the centerline of the water closet to the adjacent wall and have a dear dimension of 750 mm from the front edge of the water closet to the rear wall to facilitate side transfer; (*Details regarding wheelchair transfers are given in the annexure.*)
- The top of the water closet seat should be 500 mm from the floor as shown in the figure;
- Have a back support where there is no seat lid or tank. A back support reduces the chance of imbalance or injury caused by leaning against exposed valves or pipes;
- Preferably be of wall-hung or corbel type as it provides additional space at the toe level;
- Where water cistern is used, the cover should be securely attached; and
- Have flush control: -
- Complying with section 4.9.3;
- Which is hand-operated and located on the transfer side of the water closet; and
- Located not more than 1200 mm from the floor.
- *Preferences for toilet seat heights vary considerably. Higher seats may be an advantage to some ambulatory disabled but a disadvantage to wheelchair users. Toilet seats of 500 mm high offer a reasonable compromise. Thick seats and filler rings are available to adapt standard fixtures to these requirements.*
- *Water closet, if not situated on the side, should not be placed in a way that it impedes wheelchair mobility within the washroom.*



**Wall Hung Water Closet**

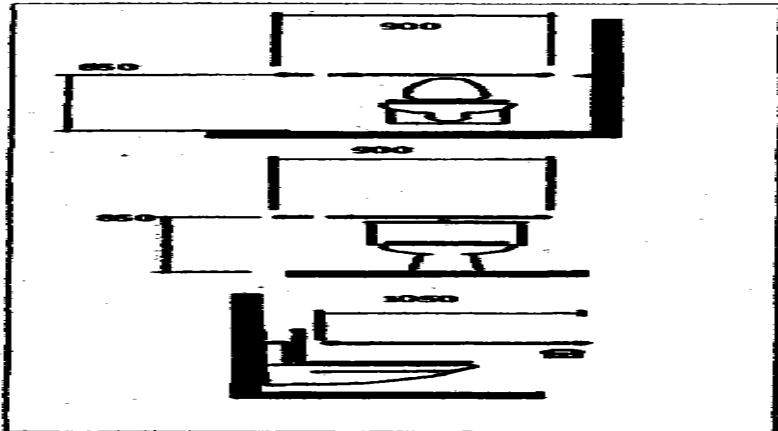
## 6.7 Water Closet Grab Bars

Water closets should be provided with grab bars, as illustrated in the figure, which should comply with the following: -

- Be in accordance with section 4.8;
- Be mounted at a height between 280 mm and 300 mm from the water closet seat;
- One horizontal grab bar should be mounted on the side wall closest to the water closet

extending from the rear wall to at least 450 mm in front of the water closet seat;

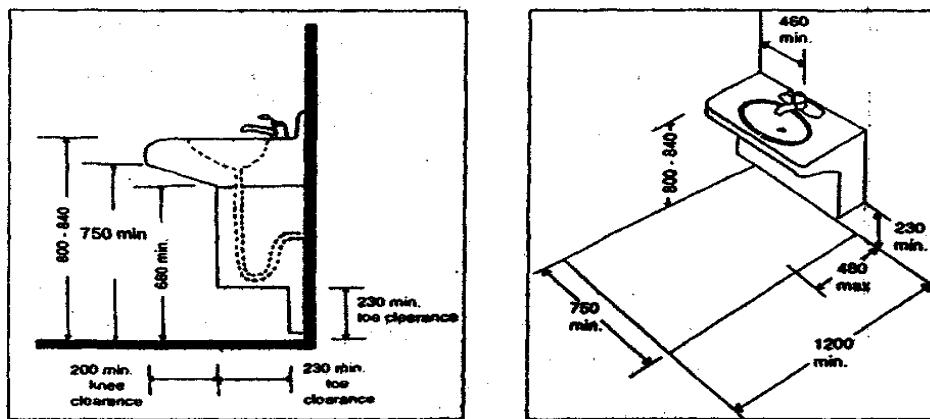
- Another horizontal grab bar should be mounted on the wall behind the water closet and be at least 750 mm long; and
- where possible, a vertical grab bar should be provided on the side wall closest to the water closet as illustrated in the figure.

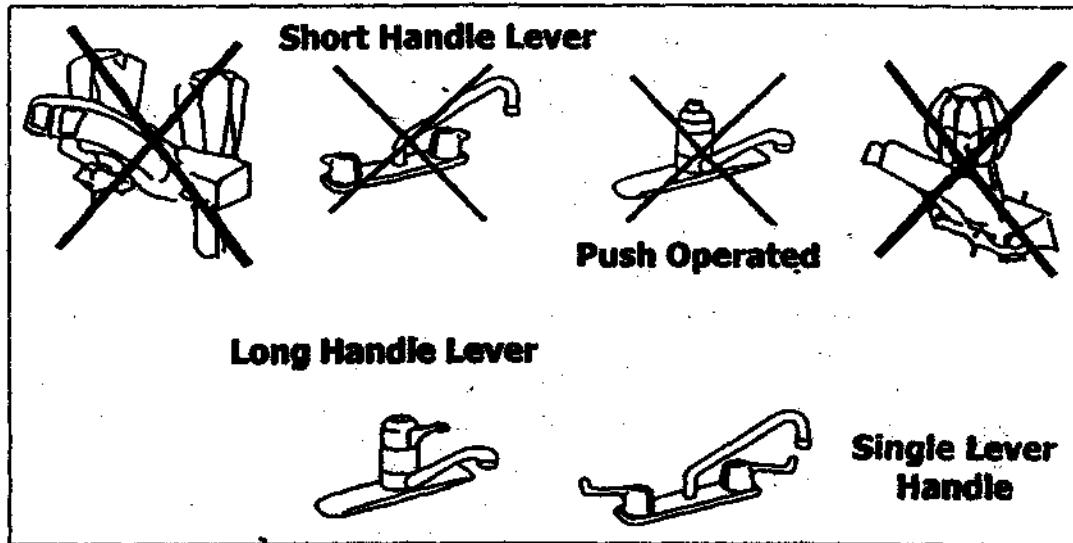


### 6.8. Wash Basin

Wash basins, as illustrated in the figure, should: -

- Be of a standard size with dimensions of approximately 520 mm x 410 mm;
- Be mounted such that the minimum distance between the centerline of the fixture and the side wall is 460 mm;
- Be mounted such that the top edge is between 800 mm and 840 mm from the floor;
- Have a knee space of at least 750 mm wide by 200 mm deep by 680 mm high with an additional toe space of at least 750 mm wide by 230 mm deep by 230 mm high;
- Have a minimum clear floor space of 750 mm wide by 1200 mm deep, of which a maximum of 480 mm in depth may be under the wash basin;
- Have the hot water and drain pipes within the knee space or toe space properly insulated; and
- Have faucets and other controls complying with section 4.9.3.
- *Where space is a constraint it may be a good option to install a corner basin.*

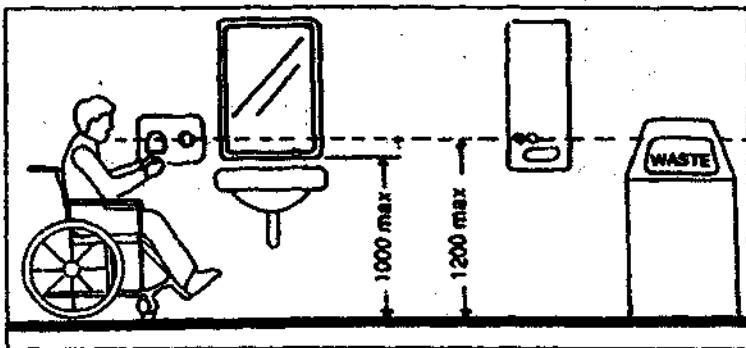




## **Washroom Accessories**

Washroom accessories should comprise the following: -

- A mirror installed In a way to have the bottom edge at a height of not more than 1000 mm from the floor as shown in the figure; and
- Towel and soap dispensers, hand dryer and waste bin positioned such that the operable parts and controls are between 1000 mm and 1200 mm from the floor.
- *Accessories should be placed in close proximity to the accessible basin, to avoid a person with wet hands wheeling a chair.*



## **6.8 Urinals**

6.8.1 Where urinals for the ambulatory disabled are provided, they should comply with the following as illustrated in the figure: -

- Be of the wall-hung type with the rim not more than 430 mm from the floor;
- Have a minimum clear floor space of 750 mm wide by 1200 mm wide without steps in front of the urinal;
- Not have privacy shields extending beyond the front edge of the urinal rim unless such shields allow a clear width of not less than 750 mm; and
- Have grab bars on both sides of the urinals:-
- extending from 1000 mm to 1500 mm above the floor level; and

- with a clear space of 120 mm between the urinal grab bar and the wall surface.

#### 6.8.2 Flush Controls should:-

- Comply with section 4.9.3; and
- Be located not more than 1200 mm from the floor.

### 6.9 Bathtub

6.9.1 There should be a clear floor space of at least 750 mm width in front bathtub. The wash basin may encroach to a maximum of 300 mm into this space provided there is a clear knee and toe space under the basin as shown in the figure.

6.9.2 The bathtub should be provided with a seat of at least 250 mm width along its entire length or with a seat of at least 400 mm depth across its width. The seat should be located at the opposite end of the controls to allow easier access.

6.9.3 The base of bathtub should be slip-resistant. Where this is not possible, a slip-resistant rubber mat may be provided.

6.9.4 The bathtub should be provided with grab bars:-

- Complying with section 4.8.3;
- At least 1200 mm long, located horizontally along the length of the bathtub, 180 mm to 280 mm above the bathtub rim; and
- At least 1200 mm long, located vertically along the foot end of the bathtub adjacent to the clear floor space with the lower end 180 mm to 280 mm above the bathtub rim as shown in the figure.

6.9.5 Faucets and other controls should :-

- Comply with section 4.9;
- Be located at the foot of the bathtub between the centerline and to the outer edge; and
- Be not more than 450 mm above the bathtub rim.

6.9.6 A shower head should:-

- Be of the handheld type;
- Be provided with a hose not less than 1500 mm long; and
- Allow for use in a fixed position.

6.9.7 Where the shower head is mounted on a vertical bar, the bar should be installed so as not to obstruct the use of grab bars.

6.9.8 Enclosures for bathtub should not:-

- Obstruct controls;
- Interfere with a person transferring from a wheelchair; and
- Have tracks mounted on the bathtub rim.

### 6.10 Shower Cubicles

6.10.1 Shower cubicles should have minimum interior dimensions of 1500 mm x 750 mm.

6.10.2 The minimum clear floor space in front of the shower entrance should be 1200 mm x 900 mm with the 1200 mm dimension parallel to the shower entrance as shown in the figure.

6.10.3 The floor of the shower should be slip-resistant. (*See annexure for additional information on slip-resistance*)

6.10.4 Grab bars for the shower cubicle should:-

- Comply with section 4.8.3;
- Have one L-shaped bar or two grab bars in L-shaped configuration between 700 mm and 800 mm from the shower floor as shown in the figure; and
- Have one grab bar at least 750 mm long installed vertically with another at least 900 mm long mounted horizontally as shown in the figure.

6.10.5 Controls for the shower cubicle should comply with section 4.9.

6.10.6 A shower head should:-

- Be of the handheld type;
- Be provided with a hose not less than 1500 mm long; and
- Allow for use in fixed position.

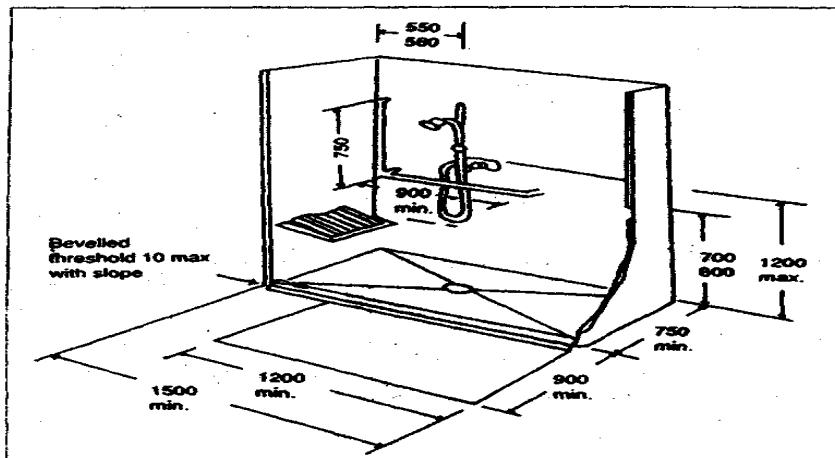
6.10.7 Where the shower head is mounted on a vertical bar, the bar should be installed so as not to obstruct the use of grab bars.

6.10.8 Curbs for the roll-in shower cubicle should not be more than 10 mm high, beveled at a slope of 1:2.

6.10.9 If a seat is provided in the shower cubicle, the seat should: -

- Be self-draining, non-slip and with rounded edge;
- Be on the wall nearest to the controls;
- Have a minimum dimension of 400 mm wide extending the full depth of the cubicle, less a space required for the shower curtain; and
- Have its top 500 mm from the floor.

6.1.8. Enclosures for the shower cubicle should not obstruct transfer from wheelchair onto shower seat.



**Shower Cubicle**

## **Chapter 7**

### **Alighting and Boarding Areas**

#### **7.1. Car Park**

##### **7.1.1. Signage**

7.1.1.1. The Symbol of Access should be displayed at approaches and entrances to car parks to indicate the provision of accessible parking lot for people with disabilities within the vicinity.

7.1.1.2. Directional signs should be displayed at points where there is a change of direction to direct people with disabilities to the accessible parking lot.

7.1.1.3. Where the location of the accessible parking lot is not obvious or is distant from the approach viewpoints, directional signs should be placed along the route leading to the accessible parking lot

7.1.1.4. Accessible parking lot should be. Identifiable by the Symbol of Access in accordance to the section 7.2.1. The sighs should not be obscured by a vehicle parked in the designated lot.

7.1.1.5. Vertical signs should be provided, in accordance to section 4.12, to make it easily visible.



##### **7.1.2. Symbol**

7.1.2.1. The Symbol of Access should be dearly marked on the accessible parking lot for drivers/ riders with disabilities only.

7.1.2.2. The Symbol painted on the designated lot should comply with section 4.12 and the following: -

- A square with dimensions of at least 1000 mm but not exceeding 1500 mm in length;
- Be located at the center of the lot; and
- o The color of the symbol should be white on a blue background.

#### 7.1.3. Car Park Entrance

The car park entrance should have a height clearance of at least 2000 mm.

#### 7.1.4. Location

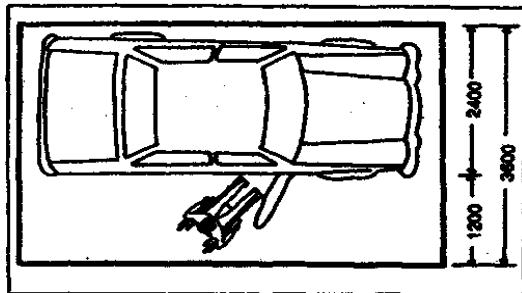
7.1.4.1. Accessible parking lots that serve a building should be located nearest to an accessible entrance and/ or lift lobby.

7.1.4.2. For a car park that does not serve a particular building, accessible parking lot should not be a part of the driveway.

7.1.4.3. The accessible route should not require persons in wheelchairs to pass behind vehicles that may be backing out

7.1.5. Accessible Car Parking Lot The accessible car parking lot should: -

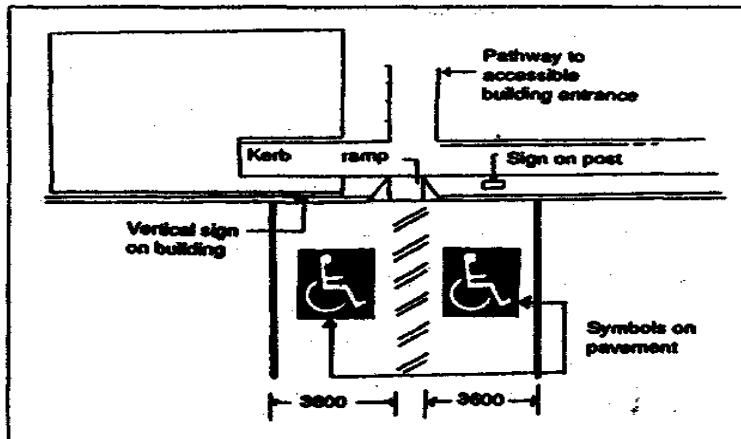
- Have minimum dimensions 4800 mm x 3600 mm;



- Have a firm, level surface without aeration slabs; and
- Wherever possible, be sheltered.

#### 7.1.6. Accessible Route

There should be an accessible route, complying with section 4.4, connecting the designated parking lot with the accessible entrance of the building.



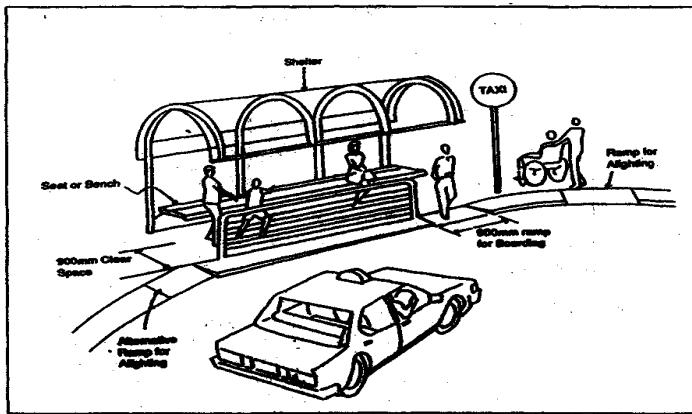
## 7.2. Taxi Stand

### 7.2.1. General

- At least one accessible route should be provided from the alighting and boarding point of the taxi stand to the walkway that leads to the accessible building entrance.
- Directional signs should be installed to direct people with disabilities to an accessible entrance.
- Guiding blocks should be provided along the accessible walkway from the taxi stand to the building entrance for the aid of people with visual impairments.
- The taxi stand pole should be visible after dark.

### 7.2.2. Location

- 7.2.2.1. Taxi stand should be located nearest to an accessible entrance.
- 7.2.2.2. A taxi bay should, where possible be provided at the level of approach or people with disabilities to alight and to board the vehicle.
- 7.2.2.3. Where transfer has to be made from a vehicular surface to a pedestrian surface, the driveway, pathway or walkway should be blended to a common level or be ramped.



### 7.2.3. Passage Width

A clear passageway-with a minimum width of 900 mm should be provided.

### 7.2.4. Handrails

Handrails should: -

- Comply with section 4.8; and
- Be Installed at a height of 900 mm from the floor level.

#### 7.2.5. Ramps

7.2.5.1. Where a taxi stand is not on the same level with the walkway or pathway, it should have two separate ramps for boarding and alighting, conforming to table 1 and as shown in the figure.

7.2.5.2. Where there are curbs between the access aisle and the vehicle pick-up space, it should have a curb ramp

#### 7.2.6. Seats

Seats should be provided at the taxi stand for people with ambulatory disabilities. These seats should be positioned such as not to impede the movement of wheelchair users.

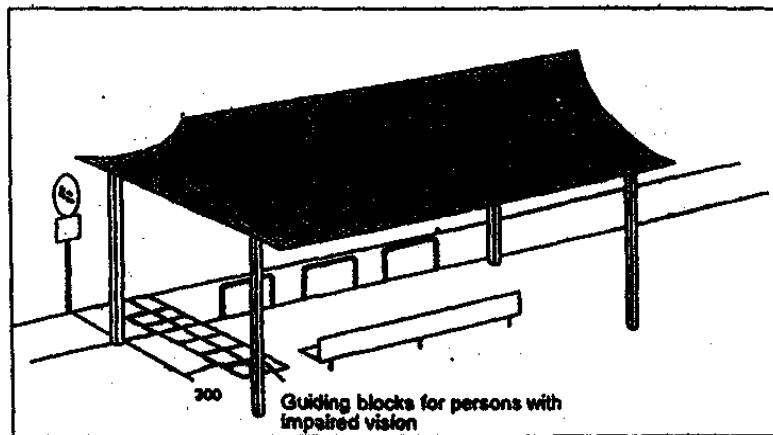
#### 7.2.7. Shelter

A shelter should be provided at the taxi stand for protection against adverse weather conditions.

### 7.3. Bus Stop

#### 7.3.1. General

- At least one accessible route should be provided from the alighting and boarding point of the bus stand to the walkway that leads to the accessible building entrance.
- Directional signs should be installed to direct people with disabilities to an accessible entrance.
- Guiding blocks should be provided along the accessible walkway from the bus stand to the building entrance for the aid of people with visual impairments.
- The bus stand pole should be visible after dark.



#### 7.3.2. Location

7.3.2.1. Bus stand should be located nearest to an accessible entrance.

7.3.2.2. Where transfer has to be made from a vehicular surface to a pedestrian surface, the driveway, pathway or walkway should be blended to a common level or be ramped.

### **7.3.3. Passage Width**

A clear passageway with a minimum width of 900 mm should be provided.

### **7.3.4. Handrails**

Handrails should: -

- Comply with section 4.8; and
- Be installed at a height of 900 mm from the floor level.

### **7.3.5. Seats**

Seats should be provided at the bus stand for people with ambulatory disabilities. These seats should be positioned such as not to impede the movement of wheelchair users.

### **7.3.6. Shelter**

A shelter should be provided at the bus stand for protection against adverse weather conditions.



### **7.3.7. Ramps**

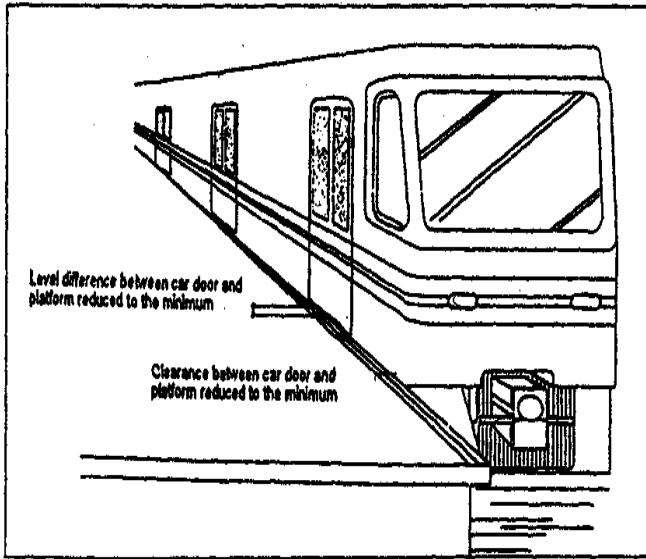
7.3.7.1. Where a bus stand is not on the same level with the walkway or pathway, it should have two separate ramps for boarding and alighting, conforming to table 1 as shown in the figure.

7.3.7.2. Where there are curbs between the access aisle and the vehicle pick-up space, it should have a curb ramp complying with section 5.1

## **7.4. Railway Station**

### **7.4.1. Level Approach**

- The approach route should not have level differences. If the station is not on the same level as the walkway or pathway, it should a ramp conforming to table 1.
- Walkway surfaces should be non-slip.
- Approach walkway should have guiding blocks for people with visual impairments



#### 7.4.2. Station Entrances and Exits

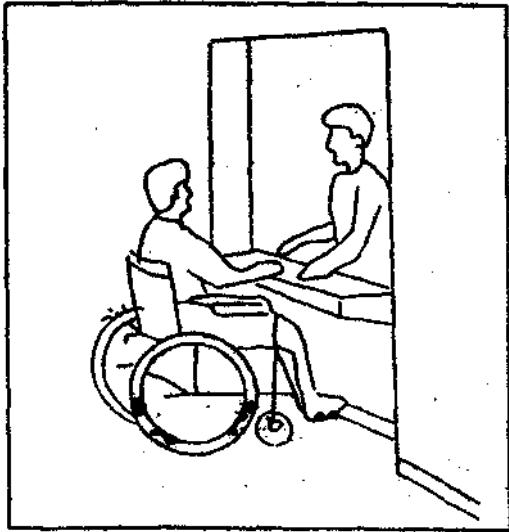
These should have a minimum width of 1600 mm and be level or ramped, complying with table 1 (Bg 39).

#### 7.4.3. General Station Interiors

- There should be a tactile layout map of the station placed right at the entrance.
- The lobby/ corridor width should be at least 1800 mm.
- The floor surfaces should be non-slip and level.
- There should be directional signs indicating all the facilities and the various platform numbers.
- The signage should also be displayed in Braille/ raised numbers to aid people with visual impairments
- Guiding and warning blocks should be installed on the corridors/concourse.
- Stairs should comply with section 5.3
- Lifts should comply with section 5.4
- All the audio announcements should be supplemented with visual information displays for people with hearing impairments.
- Seating areas should be provided at regular intervals for people with ambulatory disabilities.

#### 7.4.4. Reservation and Information Counters

- Should have clear floor space of at least 900 mm x 1200 mm in front of the counters;
- There should be at least one low counter at a height of 750 mm to 800 mm from the floor with clear knee space of 750 mm high by 900 mm wide by 480 mm deep;
- At least one of the counters should have an induction loop unit to aid people with hearing impairments; and
- The counters should have pictographic maps indicating all the services offered at the counter and at least one of the counter staff should be sign language literate.



#### 7.4.5. Toilet Facilities

There should be at least one accessible toilet complying with chapter 8.

#### 7.4.6. Ticket Gates

At least one of the ticket gates should: -

- be minimum 900 mm wide to allow a wheelchair user through; and
- have a continuous line of guiding blocks for people with visual impairments.

#### 7.4.7. Platforms

Platforms should: -

- Have a row of warning blocks installed next to the edge;
- Have non-slip and level flooring;
- Have seating areas for people with ambulatory disabilities; and
- Be well illuminated.
- *There should be no gap or difference in level between the train entry door and the platform.*

#### 7.4.8. Airports

- *Airports have similar requirements as detailed in section 7.4*

### 7.5. Piers and Jetties

#### 7.5.1. General

- All forms of water transport should be accessible to people with disabilities.
- Ferries should be fitted with accessible ramps complying with table 1 (Pg 39).
- Within a cabin, space should be set aside for securing a wheelchair in a position for comfortable integration with other passengers.
- Piers should be fully accessible and have simple boarding and disembarkation procedures.
- Guidelines for designing accessible piers and jetties are similar to the ones for railway stations except for the platform.

## **Chapter 8**

### **Fire Evacuation Needs**

Efforts to integrate people with disabilities into mainstream society may result in new or increased challenges to raise standards regarding safety in the event of fire. This section describes the important aspects of fire safety to be considered by designers, engineers, fire safety personnel, building managers, as well as non-disabled and disabled facility users.

#### **8.1. Understanding Fire**

Unless there are items in a room that are especially flammable, fire at its initial stage spreads slowly. As the fire gets bigger, toxic gases are given off; these quickly rise to the ceiling and spread under doorways. If there is enough material in the room, the fire will eventually develop very rapidly with flames and smoke engulfing the entire room or building.

If fires are discovered while they are still very small, they can usually be easily extinguished. However, a well-established fire cannot be extinguished by untrained persons and trying to stop such a fire could be extremely dangerous and could waste valuable escape time.

#### **8.2. Fire-emergency Safety**

##### **8.2.1. General Principles**

- Safety is important for everyone;
- Persons with disabilities should be helped to protect themselves; and
- Persons with disabilities should be included in fire safety training.

##### **8.2.2. Design Elements and Safety Measures**

1. It is important for buildings to be designed with safety features. Fire-safety design elements are directed towards three objectives:

- Detecting the fire;
- Separating people from the fire either by enabling prompt evacuation of the building, or by providing a refuge area within the building where occupants may safely await rescue; and
- Controlling or extinguishing the fire.

In certain cases, persons with disabilities may not require specific design features. However, adequate fire-safety education is a necessary preventive measure. In a fire-emergency situation, non-disabled persons can become handicapped. Everyone is

effectively disabled in the case of a fire. Smoke and toxic gases can obscure vision; bells and alarms can impair hearing and create panic and fear, thus limiting the judgmental abilities of everyone.

- The ideal situation is for everyone to be as aware and capable of self-preservation as much as possible during an emergency. This often involves modification of the built environment. For example: -
- Flashing lights could be activated simultaneously with an audible alarm system to alert persons with hearing impairments.
- Tactile maps showing alternative escape routes could be installed for persons who are visually impaired.
- Persons with mobility impairments require little, and sometimes, no assistance from others if areas of refuge have been pre-established and are clearly indicated.
- Large public buildings could introduce voluntary registration in the main lobby so that persons with disabilities may easily be located in case of an emergency.
- Persons with disabilities need to be included in all fire drills.

### **8.3. Alarm System**

- Alarm signals such as flashing lights, vibrating beds or variable velocity fans can alert residents with hearing and/ or visual impairments.
- Emergency exit lights and directional signals mounted near the floor have been found to be useful in cases where a lot of smoke is present.
- Pre-recorded messages and on-the-spot broadcasts from a central control centre would be of great benefit.

### **8.4. Raising the Alarm**

- Special devices, e.g., fire alarm boxes, emergency call buttons and lighted panels may be needed by persons who have hearing and/ or visual impairments.
- Telecommunication devices for persons with hearing impairments (TDD) are practical for typing in conversations. A pre-recorded message installed in the telephone would be useful for notifying the fire department.

### **8.5. Fireproof Lifts**

- High-rise buildings should have special fireproof lifts for the exclusive use of people with mobility impairments, in emergencies.
  - These lifts should comply with section 5.4
- These lifts are also beneficial for the fire fighters to get into the building in case of fire.*

### **8.6. Refuge**

An alternative to immediate evacuation of a building via staircases and/or lifts is the movement of disabled persons to areas of safety within a building. If possible, they could remain there until the fire is controlled and extinguished or until rescued by fire fighters.

It is useful to have the provision of a refuge area, usually at the fire-protected stair landing on each floor that can safely hold one or two wheelchairs.

The refuge area should:-

- Have doorways with clear opening width of 900 mm and complying with section 4.6; and

- Have an alarm switch installed between 900 mm and 1200 mm from the floor level.

-

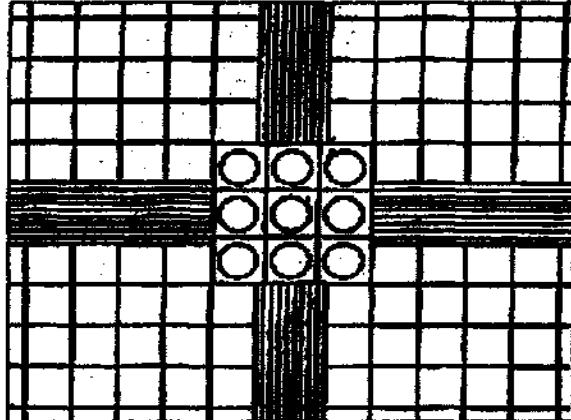
# Chapter 9

## Transport and Road Planning

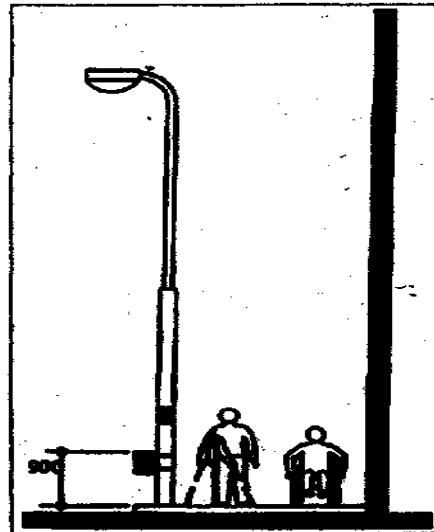
### 9.1. Sidewalk

Sidewalk should: -

- Have non-slip floor surface;
- Be along the entire length of the road;
- Be at least 1500 mm wide;
- Have guiding blocks for people with visual impairments;
- Be fitted with visual signs and tactile dues (e.g., Braille blocks) as route finders;
- Preferably have well defined edges of paths and routes by use of different colors and textures;
- Have no obstacles or projections along the pathway. If this is unavoidable, there should be clear headroom of at least 2000 mm from the floor level;
- Have curb cuts complying with section 5.1 where-ever a person is expected to walk into or off the pathway; and
- Have warning blocks installed next to all entry and exit points from the pathway.



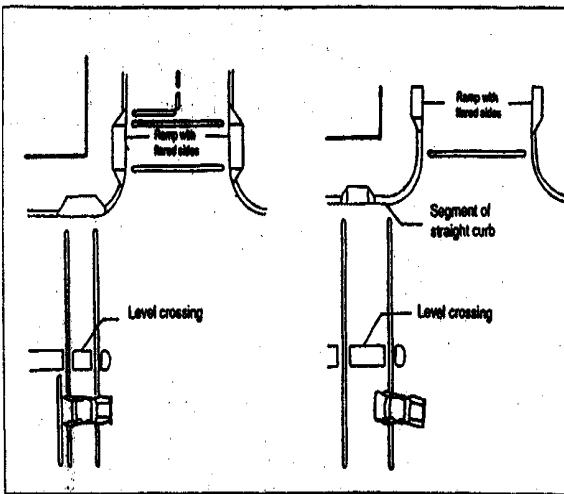
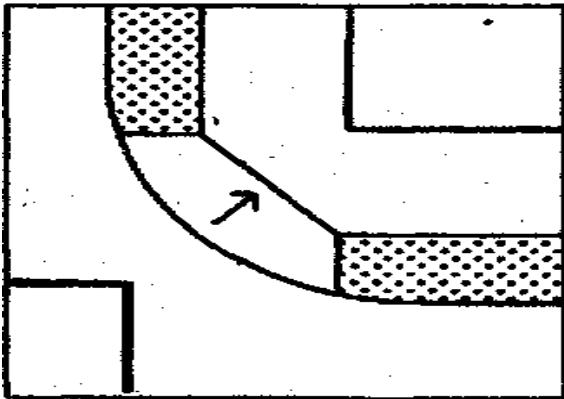
**Tactile Blocks at Pathways**



### 9.2. Curb Ramp at Walkway and Pedestrian Crossing.

9.2.1. Curb ramp at walkway should comply with section 5.1.

9.2.2. Curb ramp at pedestrian crossing should be wholly contained in the area designated for pedestrians' use as shown in the figure

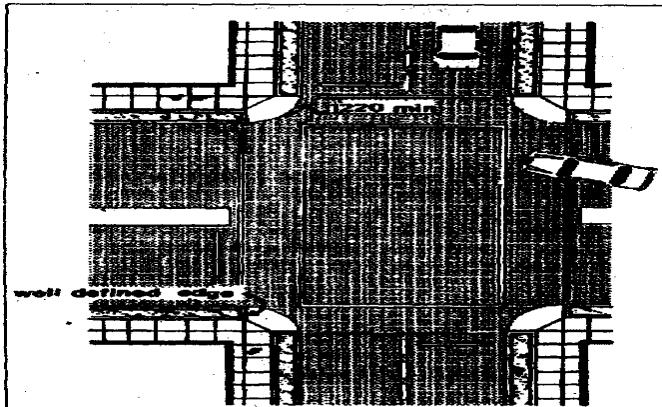


### 9.3. Road Intersections

- Pedestrian crossings should be equipped with traffic control signals;
- Constructing traffic islands to reduce the length of the crossing is recommended for the safety of all road users; and
- Guide strips should be constructed to indicate the position of pedestrian crossings for the benefit of people with visual disabilities.

*- Road bumps are helpful in reducing the speed of traffic approaching the intersection.*

### 9.4. Islands



Raised islands in crossings should: -

- Be cut through and level with the street as shown in the figure; or
- Have curb ramps, complying with section 5.1, at both the sides and have a level area of not less than 1500 mm long in the middle; and
- A colored tactile marking strip at least 600 mm wide should mark the beginning and the end of a traffic island, to guide pedestrians with impaired vision to its location.

### **9.5. Traffic signal**

- Pedestrian traffic lights should be provided with clearly audible signals for the benefit of pedestrians with visual impairments;
- Acoustic devices should be installed on a pole at the point of origin of crossing and not at the point of destination;
- The installation of two adjacent acoustic devices such as beepers is not recommended in order to avoid disorientation; and
- The time interval allowed for crossing should be programmed according to the slowest crossing persons.
- *Acoustical signals encourage safer crossing behavior among children as well*

### **9.6. Subway and Overhead Bridge**

Subways and overhead bridges should be accessible for people with disabilities. This may be achieved by: -

- Provision of slope ramps or lifts at both the ends to enable wheelchair accessibility;
- Ensuring that the walkway is at least 1500 mm wide;
- Provision of tactile guiding and warning blocks along the length of the walkway;
- Keeping the walkway free from any obstructions and projections; and
- Providing for seats for people with ambulatory disabilities at regular intervals along the walkway and at landings.

### **9.7. Public Transport**

#### **9.7.1. Land Transport**

General

- Buses, trams, taxis, mini-buses and three-wheelers should be designed as far as practicable to include facilities that can accommodate people with disabilities.
- New vehicles when purchased should comply with accessibility standards to enable all people, including those in wheelchairs, to use the service provided.
- Equally important, travel routes to bus stops should also be barrier-free to ensure that persons can travel from their homes to their chosen pick-up point. Training should be provided for drivers to help them become aware of the needs of persons with disabilities.
- For details regarding accessible bus stops refer to section 7.3

#### 9.7.1.1. Accessible buses

Accessible buses should have the following features:

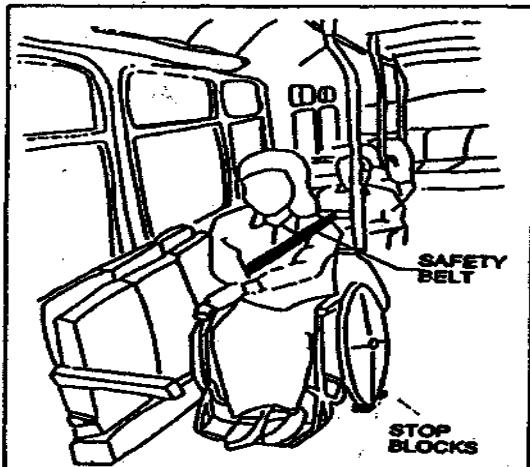
##### **Doors**

Bus doors should: -

- Be at least 900 mm wide;
- Have a low-level step installed;
- Have handrail and footlight installed; and
- Have apparatus such as a hydraulic lift or pull-out ramp installed in the doorway for wheelchair users.

##### **Wheelchair Space**

- Space for a wheelchair should be provided in an appropriate position, without preventing other passengers from getting on and off;
- The location of that space should be as indicated, inside and outside the bus, using the Standard symbol for wheelchair accessibility;
- Wheel stoppers and wheelchair safety belts should be provided.



##### **Alighting Buzzers**

- An appropriate number of alighting buzzers should be provided in positions that are easily accessible for seated or standing passengers; and
- The push button of an alighting buzzer should be clearly visible, of adequate size, installed at 900 mm to 1200 mm from the bus floor level and display the information in Braille/ raised numbers as well.

## **Information Signs**

- Information on the names of all stops along a bus route should be indicated inside the bus by displaying the text in a suitable position; and
- Information on a route and its final destination should be displayed outside the bus in large text, especially on the front and side of the bus. This information should be in a bright contrasting colour and be well illuminated by an external light to make it readable in the dark.

### **9.7.1.2. Taxi Interiors**

Taxis should be adapted to allow passengers to get in and out of them while remaining seated in their wheelchairs.

### **9.7.1.3. Rail Transport**

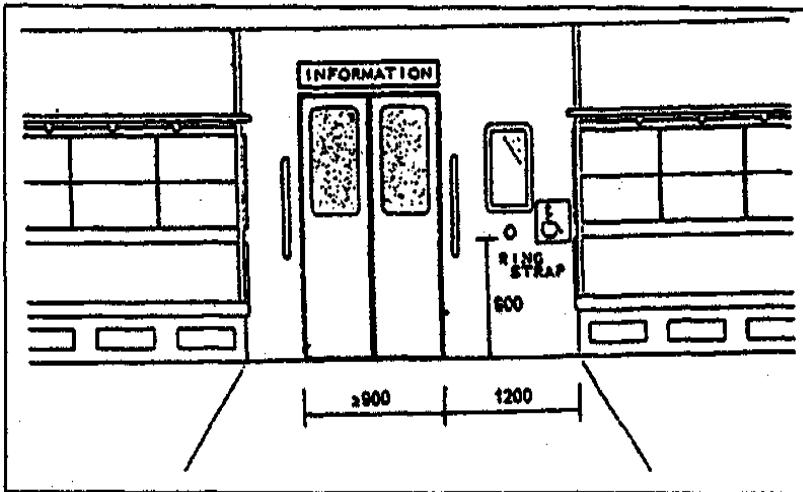
#### **General**

- Whether over-ground or underground, rail travel is a highly effective mode of transport.
- Every train should contain fully accessible carriages.
- Staff should be trained in methods of assistance and be at hand on request.
- Stations for all rail travel should be fully accessible with extra wide turnstiles where possible alongside wheelchair accessible doorways complying with section 4.6.
- Staff should be on hand to assist persons with disabilities to enter or exit through convenient gates.
- All new railway stations should be designed to be fully accessible.
- In a situation where full accessibility is not secured at the initial construction stage, it is imperative to design the layout of the station in such a manner that access features can be easily modified at a later stage.
- For details regarding accessible railway stations refer to section 7.4

#### **Accessible Railway Cars**

Railway cars should have the following features: -

- Railway Car Doors
  - Car doors should be at least 900 mm wide; and
  - The gap between the car doors and the platform should be less than 12 mm.
  - If the car door and the platform cannot be at the same level, then at least one car door should have apparatus such as a hydraulic lift or pull-out ramp installed in the doorway for wheelchair users.
- Wheelchair space
  - Space for a wheelchair should be available at the side of the door;
  - The space should be indicated inside and outside the car by using the international symbol of access; and
  - Wheel stoppers and ring-strap or other appropriate safety grip should be provided for wheelchair users.



- Seats

An appropriate number of designated seats for passengers with disabilities and elderly people should be provided near the doors.

- Aisles

Aisles should be at least 750 mm wide.

- Information Signs and Announcements

- A map of train routes should be installed. This should be in Braille/ raised numbers as well;
- In each car, there should be an announcement and provision of a visual display of the names of stations en route. This display should be in raised numbers with sharp contrast from the background.

## 9.8 Water Transport

- All forms of water transport should be accessible to people with disabilities.
- Ferries should be fitted with accessible ramps complying with table 1 (pg 39).
- Within a cabin, space should be set aside for securing a wheelchair in a position for comfortable integration with other passengers.
- Piers should be fully accessible and have simple boarding and disembarkation procedures.
- For details regarding accessible piers and jetties refer to section 7.5

### 9.8.1 Ship and Ferry Interior

- Doors should be at least 900 mm wide;
- Aisles should be at least 750 mm wide;
- An accessible toilet cubicle should be provided on board the ship, complying with section 6.3 and 6.4; and
- Wheel stoppers and ring-strap or other appropriate safety grip should be provided for wheelchair users.

## **9.9. Air Transport**

### **General**

- All domestic, short-haul aircraft should have the capacity to safely accommodate at least one wheelchair passenger.
- All national and international airports should be fully accessible and have appropriate boarding facilities.
- Special attention should be given to accessible toilet facilities on board aircraft.
- For details regarding accessible airports refer to section 7.6

### **Aircraft Interior**

- Doors should be at least 900 mm wide;
- Aisles should be at least 750 mm wide;
- An accessible toilet cubicle should be provided on board the aircraft, complying with section 6.3 and 6.4; and
  - Plugs should be accessible for passengers requiring their respirators to be plugged into electricity outlets.

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## **Chapter 10**

### **Recreational Facilities**

#### **10.1. Hotel and Eating Outlet**

##### **10.1.1. General**

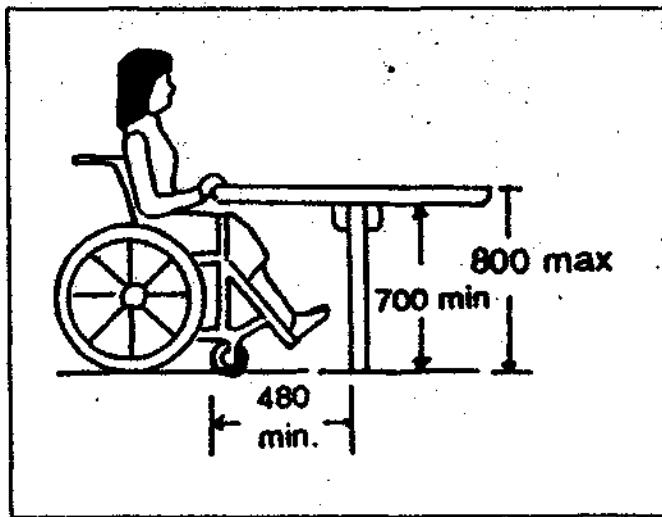
Provisions of access should be made available to people with disabilities at all eating outlets and establishments, such as food courts, fast food outlets, restaurants and hotels.

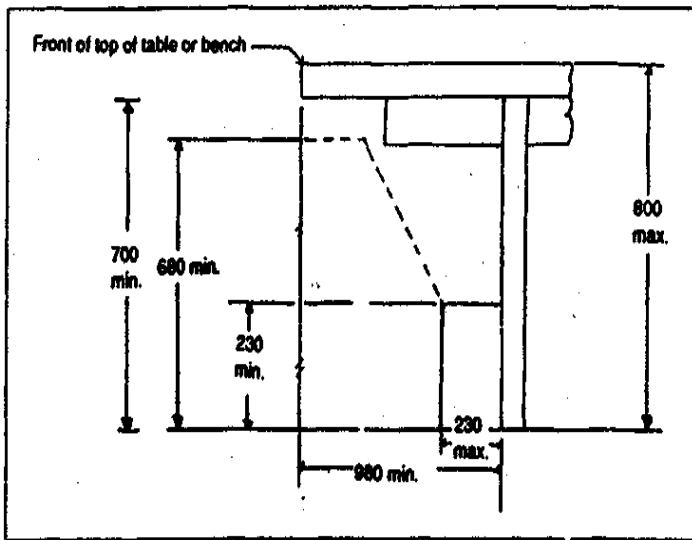
##### **10.1.2. Walkways within Outlet**

- A circulation path of at least 1200 mm wide should be provided in front of all the eating outlets.
- An accessible route with a minimum clear width of 900 mm should be provided from the circulation path to the tables reserved for people with disabilities.

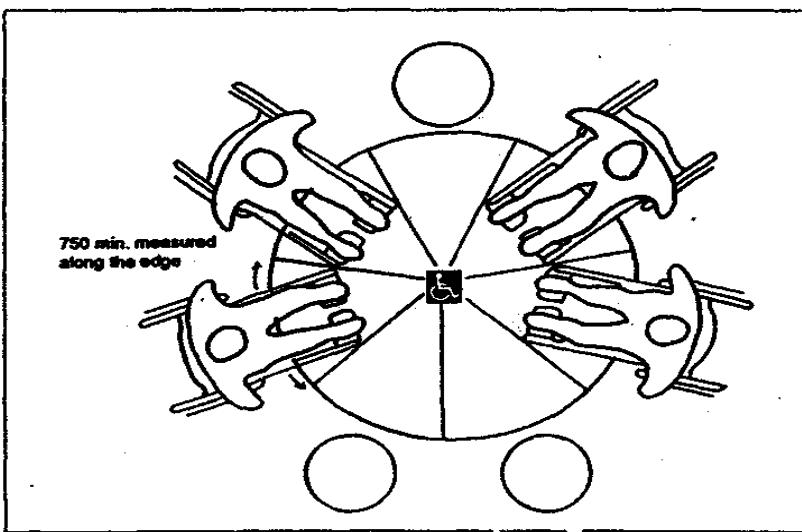
##### **10.1.3. Seating Arrangement**

- Height of the table reserved for people with disabilities should not be higher than 800 mm with a minimum clear knee space of 750 mm high and 480 mm deep as shown in the figure.





- Where the eating outlet or establishment is provided with fixed seats, the minimum clear space between the seats for a wheelchair user to pass should be 750 mm.
- *Where fixed seats are provided, it is advisable to provide empty spaces between the seats to accommodate the wheelchair user.*



#### 10.1.4. Hotel facilities

10.1.4.1. Entrance and doors should comply with section 4.6;

10.1.4.2. Flooring should comply with section 4.2;

10.1.4.3. Corridors should comply with section 4.4;

10.1.4.4. There should be at least one accessible toilet in proximity to both the waiting lobby and the restaurant and this should comply with chapter 6;

10.1.4.5. The restaurant should comply with sections 10.1.2 and 10.2.3;

10.1.4.6. At least one guestroom on the ground floor should be accessible. A sample layout plan for an accessible guestroom is given in the figure.

*For details regarding designing accessible rooms and interiors refer to chapter 11.*

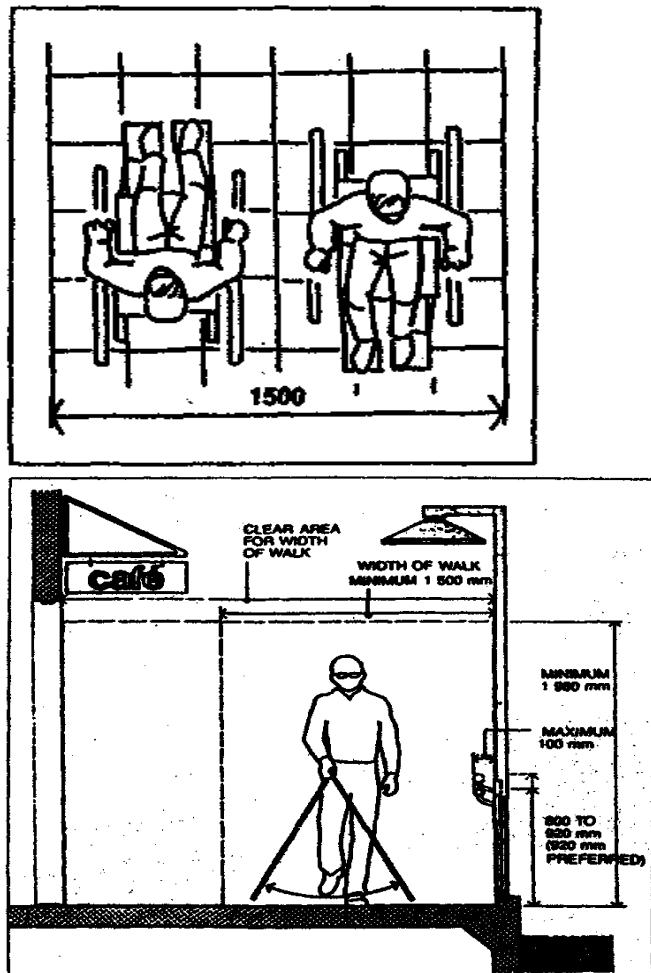
#### 10.1.5. Signage

- Directional signs should be displayed to direct people with disabilities to the reserved tables and other accessible facilities.
- All the facilities which are accessible should be marked with the Symbol of Access, as stated in section 4.12

### 10.2. Park

#### 10.2.1. Approach

- The approach pathway to the park should be level and at least 1500 mm wide. If differences in level are unavoidable, they may be ramped in accordance with table 1 (Pg 39). The pathway should also be installed with guiding blocks.

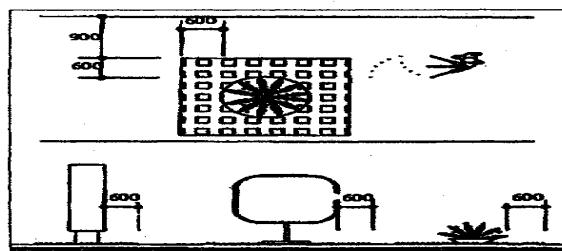
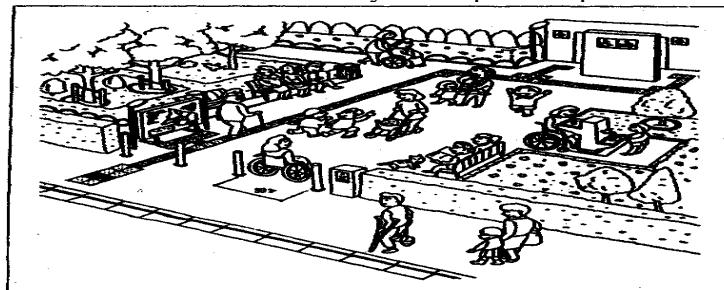


#### 10.2.2. Drains

These should be covered with covers or gratings complying with section 4.5

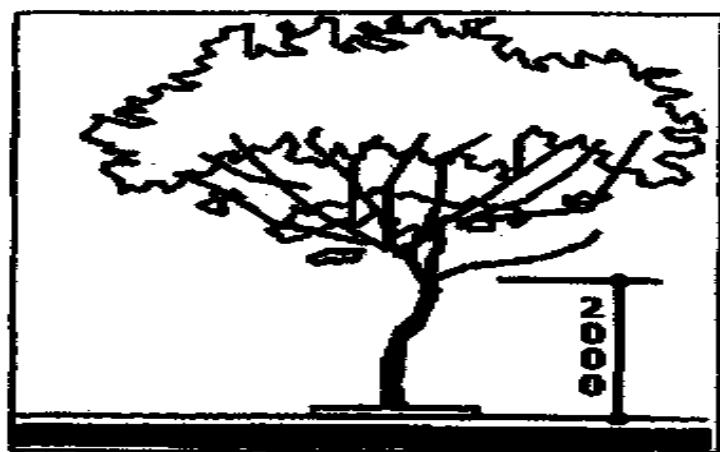
#### 10.2.3. Entrance

- The entrance width should be at least 900 mm and be level; and
- There should be a tactile layout map of the park at the entrance.



#### 10.2.4. Interiors

- Benches, dustbins and drinking water facilities should be installed with adequate space around them for wheelchair users to maneuver.
- Wheelchair accessible pathways of at least 1500 mm width should be constructed in the park.
- The pathways should also be lined with tactile guiding blocks.
- There should be warning blocks placed in proximity to obstructions, projections and hazards.



### 10.3. Auditorium and Cinema Halls

10.3.1. Accessible seating spaces should be provided in a variety of locations to give people with disabilities a viewing option.

10.3.2. Some fixed seats will have to be taken off from various locations next to the to provide wheelchair parking space of minimum 750 mm wide by 1200 mm long.

10.3.3. All the facilities should be accessible to people with disabilities.

10.3.4.

## **Chapter 11**

### **Adapted Housing**

#### **11.1. Exterior Accessibility**

##### 11.1.1. Route of Entry

11.1.1.1. Street should: -

- Have hard, non-slip and even surface;
- Be free of loose gravel;
- Provide continuing common surface not interrupted by steps or sudden changes in level and other obstructions such as manhole covers, light or telephone poles; and
- Be marked with signage in Braille and visual signage at appropriate height to indicate the shopping area, apartment blocks, bus stop, taxi stand, etc.

11.1.1.2. If there is more than one entry to the dwelling, the most accessible one should be selected considering proximity to the driveway, most level walking surface, height of stairs and available handrails.

11.1.1.3. The driveway should provide easy access to the home by means of a walkway that is level and free of cracks and uneven surfaces. For details regarding parking refer to section 7.1

11.1.1.4. Stairs should conform to section 5.3 and be provided with handrails conforming to section 4.8

11.1.1.5. If a ramp is to be installed, it should conform to section 5.2

##### 11.1.2. Entrance

11.1.2.1. Entrance should be well lit and be provided with an adequate cover from adverse weather conditions.

11.1.2.2. For wheelchair users, the entrance should have a platform of at least 1500 mm x 1500 mm. This will enable the person to rest and prepare for entry.

11.1.2.3. The door should comply with section 4.6 and have handles complying with section 4.9.

#### **11.2. General Interior Considerations**

##### 11.2.1. Furniture Arrangement

- Sufficient room should be made available for maneuvering a wheelchair (at least 1500 mm turning radius) or ambulating with an assistive device such as a walking frame or a white cane;
- Clear passage should be allowed from one room to the next;

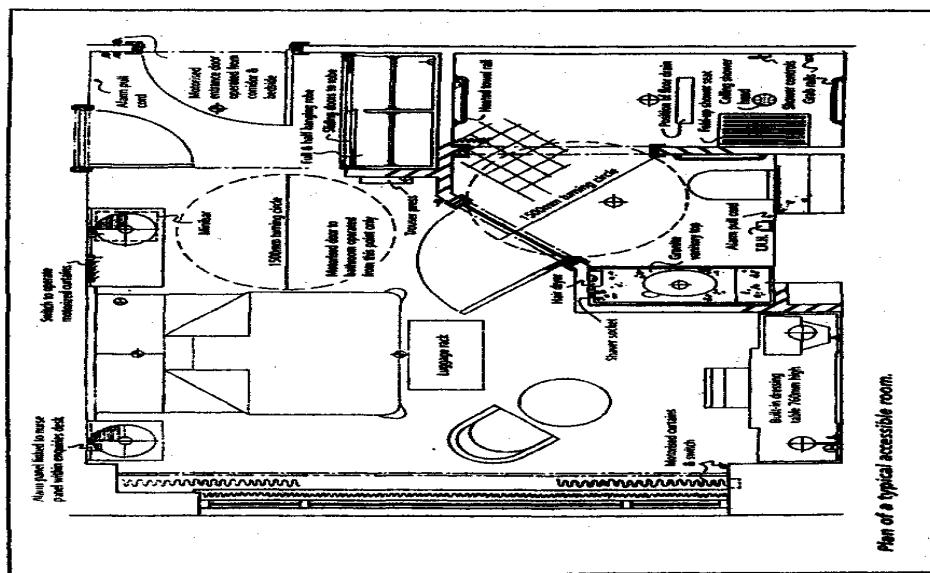
- Unrestricted access should be provided to electrical outlets, telephones and wall switches;
  - All controls and operating mechanisms should comply with section 4.9; and
  - A clear floor space for the wheelchair, of at least 900 mm x 1200 mm, should be provided in front of all the utilities and furniture.

### 11.2.2. Floors

- Floor surface should comply with section 4.2; and
  - For people with low vision, lines of brightly colored tape may be placed on the floor surface to assist mobility in poorly lighted areas.

### 11.2.3. Doors

- Should comply with section 4.6;
  - Should have handles complying with section 4.9;
  - Knurled surface door handles should be used on interiors of dwellings frequented by people with visual impairments. These abrasive, knurled surfaces indicate that the door opens to a hazardous area and alerts the individual to danger. Glass doors should be marked with a bright colored motif at eye level to aid people with low vision.



#### 11.2.4. Stairs

- Should comply with section 5.3; and
  - Should be well lit;

### **11.3. Bedroom Area**

11.3.1. The bedroom should be planned to provide a 1500 mm turning in space for wheelchair, at least near all the doors.

11.3.2. There should be a clear floor space of at least 900 mm x 1200 mm in front of all the furniture.

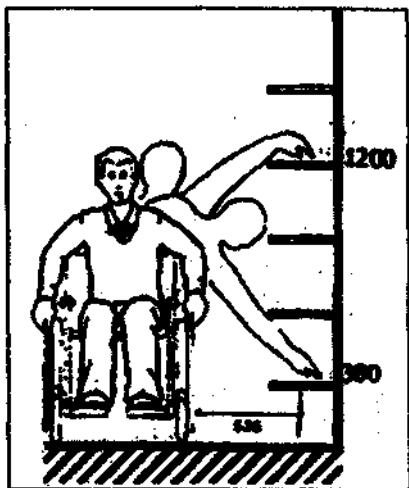
11.3.3. Bed for a wheelchair user should: -

- Have a height of 500 mm from the floor surface;
- Be stable. Stability may be improved by placing the bed against a wall or in the corner of the room (except for when the wheelchair user plans to make the bed); and
- Be positioned to provide at least a 1500 mm turning in space at the transfer side.

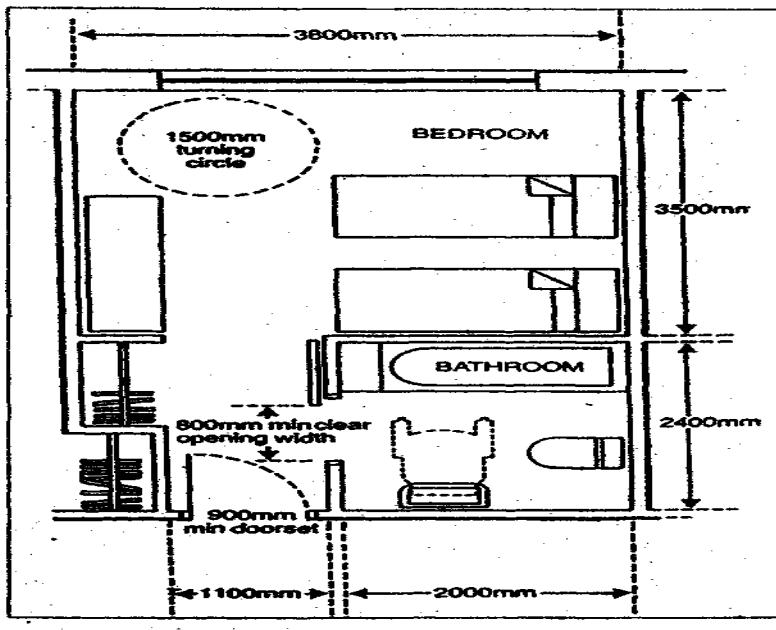
11.3.4. A bedside table or cabinet between 450 mm and 900 mm from the floor may be useful to hold a lamp, a telephone, necessary medications and a call bell if assistance is needed.

11.3.5. The closet should: -

- Have a clear floor space of at least 900 mm x 1200 mm;
- Have the clothes bar at a height of 1200 mm from the floor;
- Have shelves installed at various levels between 300 mm and 1150 mm from the floor surface;
- Have door handle conforming to section 4.9



11.3.6. Wall hook installed at a height of 1100 mm to 1300 mm may be a useful addition to the closet area.



**Adapted Bedroom**

#### 11.4. Living Room

11.4.1. At least 1500 mm turning in space for wheelchair should be provided near all entry points to the living room.

11.4.2. A living-dining combination is preferable to a kitchen-dining combination (except when the wheelchair user does the cooking).

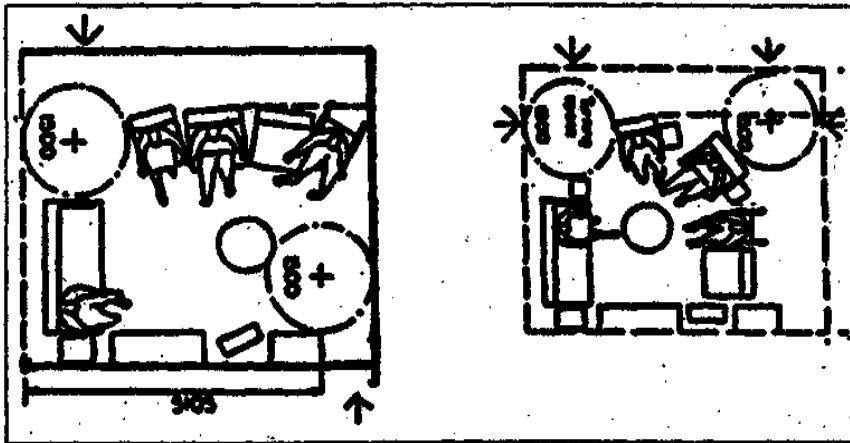
11.4.3. The seating space for a wheelchair user at the dining table should provide a clear knee space. The dear knee space for a wheelchair user is at least 900 mm wide, 480 mm deep and 750 mm nigh.

11.4.4. Floor surface should comply with section 4.2

11.4.5. There should be a clear floor space for the wheelchair of at least 900 mm x 1200 mm in front of all the fixtures.

11.4.6. Chair seat heights should not be less than 500 mm

11.4.7. Controls and operating mechanisms should comply with section 4.9



### 11.5. Washroom

Should comply with chapter 6.

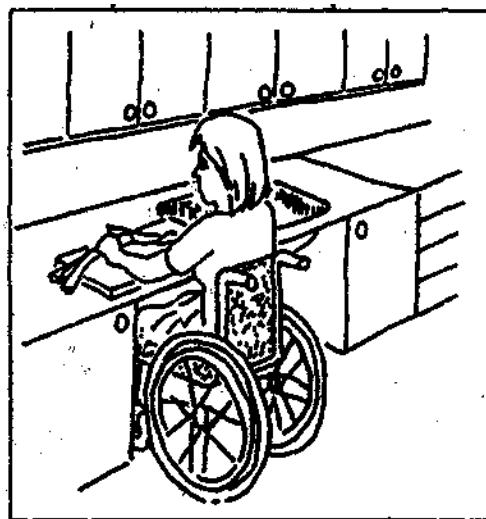
### 11.6. Kitchen

11.6.1. Wheelchair turning radius of at least 1500 mm should be provided between the counter and the opposite walls.

11.6.2. Floor surface should allow for easy wheelchair maneuverability.

Counter tops: -

- Counter tops should be between 750 mm and 800 mm in height and provide for clear knee space for a wheelchair user. The clear knee space for a wheelchair user is at least 900 mm wide, 480 mm deep and 750 mm high;
- Counter tops/ slabs should have rounded edge;
- All surfaces should be smooth to facilitate sliding of heavy items from one area to another; and
- Slide-out working spaces are useful in providing an over-the-lap working surface.



11.6.4. For people with ambulatory disabilities, stools (preferably with back and foot rests) should be provided strategically at the main work area(s).

11.6.5. Shelves and storage spaces should be between 300 mm and 1200 mm height from the floor surface.

11.6.6. All controls and operating mechanisms should comply with section 4.9

11.6.7. Any exposed hot-water pipes under the sink should be insulated to avoid burns.

11.6.8.

## **Chapter 12**

### **Annexure**

#### **12.1 Provision of Access in the 'People with Disabilities Act, 1995'**

Disability Act, 1995 casts obligations on appropriate Governments and local authorities for creating barrier free facilities. For example:

**Section 30** stipulates that the appropriate governments shall by notification prepare a comprehensive education scheme, which shall make provision for:

*(b) the removal of architectural barriers from schools, colleges or other institutions, imparting vocational and professional training*

Similarly, **Section 38** stipulates

*(1) the appropriate governments and local authorities shall by notification formulate schemes for ensuring employment of persons with disabilities, and such schemes may provide for-*

*(d) health and safety measures and creation of a non-handicapping environment in places where persons with disabilities are employed.*

To ensure right to movement for PWD's, **Section 45** calls upon the appropriate governments to provide for-

- (a) installation of auditory signals at red lights in the public roads for the benefit of persons with visual handicap;*
- (b) causing curb cuts and slopes to be made in pavements for the easy access of wheelchair users*
- (c) engraving on the surface of the zebra crossing for the blind or for persons with low vision;*
- (d) engraving on the edges of railway platforms for the blind or for persons with low vision;*
- (e) devising appropriate symbols of disability;*

In protection of the Right to have free access to public places, the Disability Act in Section 46 enjoins upon the appropriate governments and the local authorities to provide for: -

- (a) ramps in public buildings;*
- (b) Braille symbols and auditory signals in elevators or lifts;*
- (c) ramps in hospitals, primary health centres and other medical care and rehabilitation institutions.*

The architects of the Disability Act were perhaps conscious of the fact that for creation of barrier free environment in educational institutions, vocational training centres, places of work and in other public places, special designs of buildings and special technologies

would need to be developed.

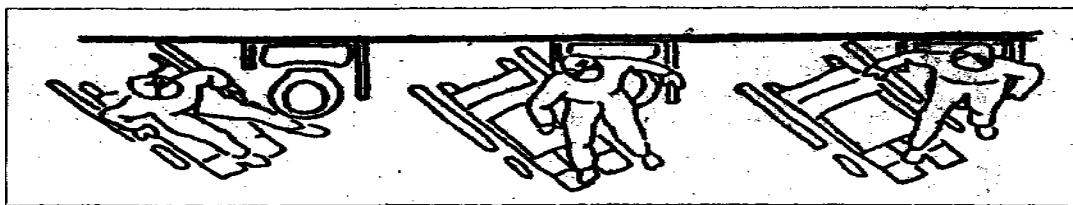
Therefore, Section 48 the Act calls upon the appropriate governments and local authorities to promote and sponsor research, Inter alias, in the *on site modifications in offices and factories*.

## 12.2 Slip Resistant Floor Surfacing

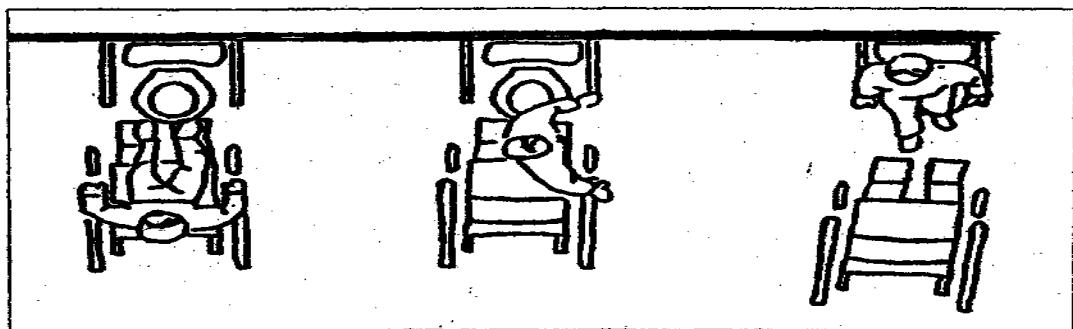
Slip resistant surfacing			
Material	Dry and unpolished	Wet	Remarks
Clay Tiles (Carborundum finish)	Very Good	Very Good	May be suitable for external stairs
Carpet	Very Good	Good	
Clay Tiles (Textured)	Very Good	Good	May be suitable for external stairs
Cork Tiles	Very Good		
PVC with non-slip granules	Very Good	Good	
PVC	Very Good	Poor to fair	Slip-resistance when wet may be improved if PVC is textured. Edges of sheet liable to cause tripping if not fixed firmly to base.
Rubber (sheets or tiles)	Very good	Very poor	Not suitable near entrance doors.
Mastic asphalt	Good	Good	
Vinyl Asbestos tiles	Good	Fair	
Linoleum	Good	Poor to Fair	Edges of Sheets may cause tripping if not securely fixed to base
Concrete	Good	Poor to fair	If a textured finish or a non-slip aggregate is used, slip resistance value when wet, may be increased to good.
Granolithic	Good	Poor to fair	Slip-resistance when wet may be improved to good, by incorporating carborundum finish.
Cast Iron	Good	Poor to fair	Slip-resistance may be acceptable when wet if open treads used.
Clay Tiles	Good	Poor to fair	Slip-resistance when wet and polished very poor

Terrazzo	Good	Poor to fair	Non-Slip nosing necessary on stairs. Slip-resistance when polished or if polish is transferred by shoes from adjacent surface very poor.
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### 12.3 Understanding Wheelchair Transfers



**Side Transfer**



**Forward Transfer**

### 12.4 Minimum Access Provisions

It will be ideal to have all buildings completely accessible but following are the minimum access needs:

#### 1.1 Type of building

- |   |   |
|---|---|
| - Single detached, single dwelling units                            | A minimum of 2 percent of the total number of units to be constructed with barrier free environment                         |
| - Staff housing, multiple dwelling and high rise residential units. | A minimum of 1 unit for every 25, plus 1 additional unit for every 100 units thereafter.                                    |
| Tenement houses, row houses, apartments and town houses             | A minimum of 1 unit for up to 150 units, and a minimum of 1 additional unit for every 100 units thereafter to be accessible |

- Post offices, banks and financial service institutions	A minimum of 1 lowered service counter on the premises.
	A minimum of 1 lowered automatic teller machine (ATM) / cash disbursement point on the premises. Stamp vending machine.
- Shop-houses and single storey shops	Accessible shopping arrears
- Places of worship	Entrances and exits and main area of worship to be accessible Temples: access to shrines and courtyards Mosques: access to area for ablution Churches: access to confessionals, and chapels.
- Food centres	A minimum of 1 table without stools or seats attached to the floor for every 10 tables. A minimum of 2 tables without stools or seats attached to the floor for the whole premises Accessible entrance
- Community centers, village halls, auditoria, concert halls, assembly halls, cinemas, theaters and other places of public assembly.	Accessible entrance exists, aisles and main community or public gathering areas Accessible toilet facilities should be nearby Seating for persons with disabilities to be accessible from main entrances and lobbies. Various seating/viewing choice to be provided for persons in wheelchairs throughout the main seating area A minimum of 2 wheelchair spaces for seating capacity up to 100 seats A minimum of 4 wheelchair spaces for seating capacity for over 100 to 400 seats.

## **12.5 Rural Requirements**

The majority of people in India live in rural areas. In the coming decade, notwithstanding rapid urbanization, there will be a higher increase in absolute numbers of the rural population. Higher rates of mortality and morbidity, a lower rate of literacy and a higher incidence of poverty and deprivation characterize rural communities, placing them in a less advantageous position than their urban counterparts.

Furthermore, while several basic amenities such as piped water supply, sanitation, toilets and access to the mass media (e.g., radio and television) are available to urban residents at the household level, in rural areas, these are often available only as community amenities.

The urban built environment includes modern public facilities for education, training, employment and self-employment, as well as entertainment. In contrast, the rural built environment includes standpipes and wells, village dispensaries, primary schools, community toilets and water tanks, village markets, agricultural extension centres and village or district administrative institutions. These facilities have an impact on the daily lives of people in the rural areas. The extent to which the facilities are accessible and usable by persons with disabilities and elderly people determines their integration into rural community life.

Some of the issues faced by rural disabled persons and elderly people are: non-accessible paths, roads without pavements and non-accessible toilets or latrines. While planning and design requirements for urban settings could be adapted for rural built environments, due attention needs to be given to local conditions.

Planning and design for the rural areas should take into consideration the options presented by local solutions using locally available materials. Applied research and experimentation in the use of appropriate technology for the development of barrier-free design for the rural built environment are urgently needed. This is an area for exchange of information among the developing countries especially in the Asian region.

Governments, especially local authorities, have a responsibility to improve the understanding of issues concerning barrier-free environments in rural communities. This is particularly so in the case of remote rural areas where there is a lack of non-governmental organization (NGO)

development assistance and the communities have limited access to the mass media. The need for public awareness activities in rural areas is critical in view of the greater difficulty, compared with urban areas, in enforcing access legislation and policy provisions. Actions to improve public awareness of access issues among rural communities include the mobilization of village-level opinion leaders and involving them in dissemination of the relevant messages using folk and traditional media.

## **12.6 Conducting Access Audits**

Access audits are surveys conducted of already built environment that needs to be made accessible. The access audit team should preferably consist of the following:

- People with disabilities who understand access needs
- Architect or a civil engineer, ideally of the building being audited.

Before going for the access audit make sure you have the following things:

- The audit Checklist
- Measuring tape
- A writing pad and a pen
- A camera
- A hat or dark glasses especially if you are surveying external environment

Once you have reached the building to be surveyed follow the checklist and keep checking the accessibility, beginning from the parking to the main entrance and through all the sections of the building.

It is important to keep measuring the heights and widths of all areas you pass through like the height of the stairs, width of the doors, size of the toilet, height of the counters etc.

Keep discussing the changes you recommend for specific barriers with the architect or the civil engineer. Also whatever recommendations are thought of keep jotting them down on the writing pad along with the existing measurements.

While surveying the building keep photographing the areas that need change so that they can be a reminder while drafting the main report and also when the report is submitted to the authorities it is easier to make them understand the change required.

Once the survey is over you need to have your photographs developed and prepare a final report to be submitted to the authorities for incorporating the changes.

The final report should be precise with well thought out recommendations. As far as possible, suggest low cost simple solutions, as these solutions are most likely to be implemented by the authorities. But even though a recommendation may be expensive to implement, if it is essential, make that recommendation with suitable reasoning. Also with all recommendation do not forget mention the present measurements along with the ideal measurements. Supplement the final report with the photographs and if possible illustrations so that it is easy for the authorities to understand.

Your role does not end with the submission of the report. Once you have submitted your final report keep following up with the authorities to make sure that the changes in the building are made.

## **12.7 Access Audit Forms**

### **ACCESS AUDIT FORM FOR EXTERNAL ENVIRONMENT**

Name of the Building: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_ Date of Survey: \_\_\_\_\_

Name of Surveyor:	A Car park	Y/N	Recommendations
	<ul style="list-style-type: none"><li>- Is there an accessible parking for people with disabilities?</li><li>- Is the number of accessible parking enough<sup>7</sup></li><li>- Is accessible parking within 50.00m from the building?</li><li>- Is there accessible indoor parking located closest to accessible elevators?</li><li>- Is the international symbol of access imprinted on the parking?</li><li>- Is there a vertical, visible signboard indicating that the lot is for use by a disabled driver only?</li><li>- Do curb ramps connect accessible parking spaces with side curbs?</li><li>- If there are no curb cuts, then</li></ul>		

	<p>are there tactile markings at least 600mm wide to separate pathway from the parking?</p> <ul style="list-style-type: none"> <li>- Or, are there pre-cast wheel stops or bollards to separate pathway fro the parking?</li> <li>- Is the size of the parking at least 4800mm x 3600mm?</li> <li>- Is the drop off area marked by signage?</li> <li>- If the drop off area has a curb, is there a curb cut leading to the pathway?</li> <li>- If the drop off area has no curb, is there warning for the benefit of visually impaired?</li> </ul>		
B	Taxi stand	Y/N	Recommendations
	<ul style="list-style-type: none"> <li>- Is there a taxi stand near the building? <ul style="list-style-type: none"> <li>- If there is a curb at the taxi stand, is there a curb cut leading to the pathway?</li> </ul> </li> </ul>		
c	Mailboxes	Y/N	Recommendations
	<ul style="list-style-type: none"> <li>- Is the mail box slot mounted at a maximum height of 1200mm?</li> </ul>		
D	Water cooler	Y/N	Recommendations
	<ul style="list-style-type: none"> <li>- Is the height of the water cooler tap between 750mm to 900mm?</li> </ul>		

	<ul style="list-style-type: none"> <li>- Is it easy to operate the cooler tap?</li> <li>- Is there proper drainage to keep the area dry around the water cooler?</li> </ul>		
E	Pathways	Y/N	Recommendations
	<ul style="list-style-type: none"> <li>- Is the pathway clear of all obstructions?</li> <li>- Is the pathway clear of steps and stairs?</li> <li>- Are there guiding lines installed along the line of travel?</li> <li>- Are there warning blocks around any obstruction?</li> <li>- Is the path at least 900mm wide?</li> <li>- Is the surface level, smooth and non slippery?</li> <li>- Does the pathway have a different color and texture than the adjacent surface?</li> <li>- Are all manholes placed outside the pedestrian path travel?</li> <li>- Are the grating openings narrow, not more than 13mm?</li> <li>- Are the gratings perpendicular to the direction of travel?</li> </ul>		

	- Is there an edge protection along the pathway minimum of 13mm?		
F	Curb cuts	Y/N	Recommendations

	<ul style="list-style-type: none"> <li>- Are curb ramps provided at all level differences between the road surface and pathway level:           <ol style="list-style-type: none"> <li>1. Pedestrian crossings?</li> <li>2. Accessible parking space?</li> <li>3. Building entrances?</li> </ol> </li>   <li>- Are curb ramps located at each corner of street intersections?</li>   <li>- Is every curb ramp faced by another curb ramp on the opposite side of the street?</li>   <li>- Is the slope of the curb ramp no more than 1:12?</li> </ul>		
G	Pedestrian crossings	Y/N	Recommendations

- Is the road surface even and slip-resistant at pedestrian crossings?

- Are pedestrian traffic lights installed?

- Do traffic lights have both audible and visual signals?

- Are push-buttons located at a maximum height of 1200mm?

- Do traffic islands have street-

	level pathways cut through them with a minimum width of 1500mm?		
H	General obstructions	Y/N	Recommendations

	<ul style="list-style-type: none"> <li>- Are there any protruding objects within the path of travel not been detected by a sightless person with a cane?</li> <li>- Are the protruding objects marked with tactile warning at least 60mm beyond the projection area of the obstruction?</li> <li>- Are all overhanging obstructions mounted above a minimum height of 2000mm?</li> <li>- Are all obstructions with the path of travel marked with contrasting colors?</li> </ul>		
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### **ACCESS AUDIT FORM FOR INTERNAL ENVIRONMENT**

Name of the Building: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_ Date of Survey: \_\_\_\_\_

Name of Surveyor: \_\_\_\_\_

A	Main entrance	Y/N	Recommendations

	<ul style="list-style-type: none"> <li>- Is the main entrance of the building accessible?</li> <li>- Are there any steps at the entrance?</li> <li>- Do the steps have a hand railing?</li> <li>- Are there railings on both the sides?</li> <li>- Is there a ramp?</li> <li>- Does the ramp have a railing?</li> <li>- Is the railing on both the sides?</li> <li>- Is the clear door width at least 900mm?</li> <li>- Can the entrance door be operated independently?</li> <li>- Is the height of the door handle between 900mm and 1100mm?</li> <li>- Does the accessible entrance</li> </ul>		
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	permit access to an elevator?		
	<ul style="list-style-type: none"> <li>- Is the accessible entrance clearly identifiable?</li> <li>- Is the landing surface non-slippery?</li> </ul>		
B	Doors	Y/N	Recommendations

	<ul style="list-style-type: none"> <li>- Can the doors be operated without much effort?</li> <li>- Do automatic doors have sufficiently long opening intervals?</li> <li>- Are push buttons for automatic doors located at a maximum height of 1200mm? (not exceeding 1300mm)</li> <li>- Is there sufficient space beside the latch side of the door? (minimum 300mm)</li> <li>- Are accessible doors placed adjacent to revolving doors and turnstiles?</li> <li>- Are glazed doors marked with a colored band at eye level?</li> <li>- Is minimum clear width of interior doors at least 800mm?</li> <li>- For double leaf doors, is the width of one of the leaves at least 800mm?</li> <li>- Do doors fitted with spring closers have an extra pull</li> </ul>		
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	handle?		
	<ul style="list-style-type: none"> <li>- Is manual door hardware (handle, lock, pulls etc.) located no higher than 1200mm (not exceeding 1400mm)?</li> <li>- Are door mats flush with the floor surface and secured to the floor at all edges?</li> <li>- Is the threshold no more than 20mm high and beveled?</li> </ul>		
C	Corridors	Y/N	Recommendations

	<ul style="list-style-type: none"> <li>- Is the minimum unobstructed width of corridors at least 900mm?</li> <li>- Does the corridor width allow maneuvering through doors located along its length?</li> <li>- Are differences in level bridged by ramps or lifts?</li> <li>- Can a sightless person with a cane detect all protruding objects within the corridor?</li> <li>- Are all overhanging obstructions mounted at a minimum height of 2000mm?</li> <li>- Can a person with partial sight easily identify all obstacles in the corridor?</li> </ul>		
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D	Elevators	Y/N	Recommendations
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<ul style="list-style-type: none"> <li>- Is there an accessible path leading to the elevator?</li> <li>- Is the clear door opening width more than 900mm?</li> <li>- Are the minimum internal dimensions of the elevator at least 1200mm x 1400mm?</li> <li>- Is the height of the call button (outside the lift) between 900mm and 1100mm?</li> <li>- Is the control panel placed at a height of between 900mm and 1200mm from the floor level?</li> <li>- Is there an audio and visual system installed in the lift indicating arrival at a floor?</li> <li>- Are there Braille/raised numbers (for visually impaired persons) to use the control panel?</li> <li>- Is the elevator provided with hand rails on three sides?</li> <li>- Are the handrails mounted at a height between 800mm and 900mm?</li> <li>- Is the elevator door easy to identify?</li> <li>- Is the emergency intercom usable without voice communication?</li> </ul>		
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	<ul style="list-style-type: none"> <li>- Are there tactile or Braille instructions for the communication system?</li> <li>- Is the door opening/closing interval long enough?</li> <li>- Is the finish of the elevator floor skid-resistant?</li> </ul>		
E	Stairs	Y/N	Recommendations
	<ul style="list-style-type: none"> <li>- State where the stairs are located.</li> <li>- Is the minimum width of stairs 900mm?</li> <li>- Are there continuous handrails on both sides of the stairs at the height of 800mm to 900mm?</li> <li>- Is a handrail installed in the center if the stair width is more than 3000mm?</li> <li>- Is there a landing located after the stairs cover a level difference of more than 2500mm?</li> <li>- Is the landing length not less than 1200mm?</li> <li>- Do the stairs have a nosing?</li> <li>- Is the nosing of a different texture or color to be identifiable by visually impaired persons?</li> </ul>		

	<ul style="list-style-type: none"> <li>- Are there warning blocks installed at the beginning and end of all flights?</li> <li>- Is the location of the stairs clearly identifiable?</li> <li>- Is the location of emergency stairs clearly identifiable?</li> <li>- Do treads have a non-slip surface?</li> </ul>		
F	Slope ramps	Y/N	Recommendations
	<ul style="list-style-type: none"> <li>- Is there a ramped route next to the stairs?</li> <li>- Is the ramp gradient no steeper than 1:12?</li> <li>- Is there a landing of at least 1200mm length, at 10,000mm intervals?</li> <li>- Is there a landing at every change in direction?</li> <li>- Is there a landing at top and bottom of every ramp?</li> <li>- Are there continuous handrails on both sides at the height of 800mm to 900mm?</li> <li>- Is the width of the ramp at least 900mm?</li> <li>- Is the surface of the ramp slip-resistant?</li> <li>- Is the location of the ramp clearly identifiable?</li> </ul>		
G	<ul style="list-style-type: none"> <li>- Is there an edge protection on both sides of the ramp?</li> </ul>	Y/N	Recommendations

	<ul style="list-style-type: none"> <li>- Are handrails, mounted at a height between 850mm and 900mm?</li> <li>- Are handrails easy to grip?</li> <li>- Are railings securely attached?</li> <li>- Do handrails extent horizontally between 300mm and 450mm at the top and bottom of every staircase or ramp?</li> <li>- Are the endings of the handrail grouted into the ground or - turned downwards?</li> <li>- Are handrails continuous throughout the full length of ramps and stairs?</li> <li>- Are low windows at landings protected by railings?</li> <li>- Is the space between the handrail and the wall no less than 40mm for smooth walls, and 60mm for rough textured walls?</li> <li>- Are the handrails painted in contrasting colors to be easily identifiable?</li> <li>- Are there tactile strip identifications on the handrails</li> </ul>		
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	for emergency stairs?		
H	Restrooms	Y/N	Recommendations

	<ul style="list-style-type: none"> <li>- Are there separate restrooms for disabled people?</li> <li>- Are the restrooms easily identifiable?</li> <li>- Is there sufficient space inside the restrooms to maneuver a wheelchair?</li> <li>- Do individual washrooms have clear dimensions between opposite walls of not less than 1750mm?</li> <li>- Are water closets and bidets mounted at a height between 450mm and 500mm?</li> <li>- Is the space between the toilet seat and the closest adjacent wall fitted with a grab bar between 450mm and 500mm?</li> <li>- Is the accessible wash basin mounted at a height between 800mm and 850mm?</li> <li>- Is the lower edge of the mirror positioned at a height not exceeding 1000mm?</li> <li>- Are the accessible showers and bathtubs provided with folding seats?</li> <li>- Is the floor of tub slip-resistant?</li> </ul>		
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	<ul style="list-style-type: none"> <li>- Are grab bars installed in water closets, bath tubs, and showers at a height of 850mm and 950mm?</li> <li>- Do grab bars have a diameter between 30mm and 40mm?</li> <li>- Do wall mounted grab bar have a clearance between 35mm and 40mm?</li> <li>- Are grab bars non-slippery?</li> <li>- Can the grab bars withstand the load?</li> <li>- Are faucets easy to grip and operate with one hand?</li> <li>- Are shower fixtures with at least 1500mm long hoses?</li> <li>- Are hot water pipes insulated or covered?</li> <li>- Is the rest room equipped with an alarm system?</li> <li>- Can doors be locked from inside and releasable from outside under emergency situations?</li> <li>- Are flushing arrangements, dispensers and toilet paper mounted between 500mm and 1200mm?</li> <li>- Are flushing mechanisms easy to operate?</li> </ul>		
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	<ul style="list-style-type: none"> <li>- Is the floor material skid-proof, well drained and waterproofed?</li> <li>- Do pivoted doors open outwards?</li> </ul>		
I	Eating outlets	Y/N	Recommendations

	<ul style="list-style-type: none"> <li>- Is the eating outlet identifiable?</li> <li>- Is the eating outlet accessible to people with disabilities?</li> <li>- Is there a circulation path of at least 900mm wide to allow a wheelchair user to move around the eating outlet?</li> <li>- Are the cash and service counter height below 850mm?</li> <li>- Is the table accessible with a height of 750mm to 850mm and knee space of 750mm wide and 480mm deep?</li> <li>- Do the tables with fixed stools have accessible spaces for wheelchairs?</li> </ul>		
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J	Public telephones	Y/N	Recommendations
	<ul style="list-style-type: none"> <li>- Are there public, telephones accessible to wheelchair users?</li> <li>- Is there at least one telephone in the building equipped with a loop induction unit?</li> </ul>		

	<ul style="list-style-type: none"> <li>- Are the numerals on the telephone raised to allow identification by touch?</li> <li>- Is there proper signage directing to the public telephone?</li> <li>- Are the height of the operable parts of the telephone between 800mm and 1200mm?</li> <li>- Is there a dear knee space of more than. 750mm?</li> </ul>		
K	Resting facilities	Y/N	Recommendations

	<ul style="list-style-type: none"> <li>- Where there are large spaces are resting facilities provided between 100.00m to 200.00m?</li> <li>- Is there an adjoining space for a wheelchair next to benches and public seats?</li> <li>- Are public seats between 450mm and 500mm height?</li> <li>- Are the tops of tables between 750mm and 900mm height?</li> <li>- Are knee spaces at accessible tables at least 750mm high, 900mm wide and 480 mm deep?</li> </ul>		
L	Reception & information	Y/N	Recommendations
	<ul style="list-style-type: none"> <li>- Are the counters easily identifiable?</li> </ul>		

	<ul style="list-style-type: none"> <li>- Is the counter height between 750mm to 900mm?</li> <li>- Is a part of the counter lowered to accessible height?</li> <li>- Is a loop induction unit installed at the counter?</li> <li>- Are there tactile pictographic maps of the building near the counter?</li> <li>- Is the counter well illuminated?</li> </ul>		
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## 12.8 International Symbol of Access

12.8.1. The form of the Symbol of Access for people with disabilities should comply with the following:-

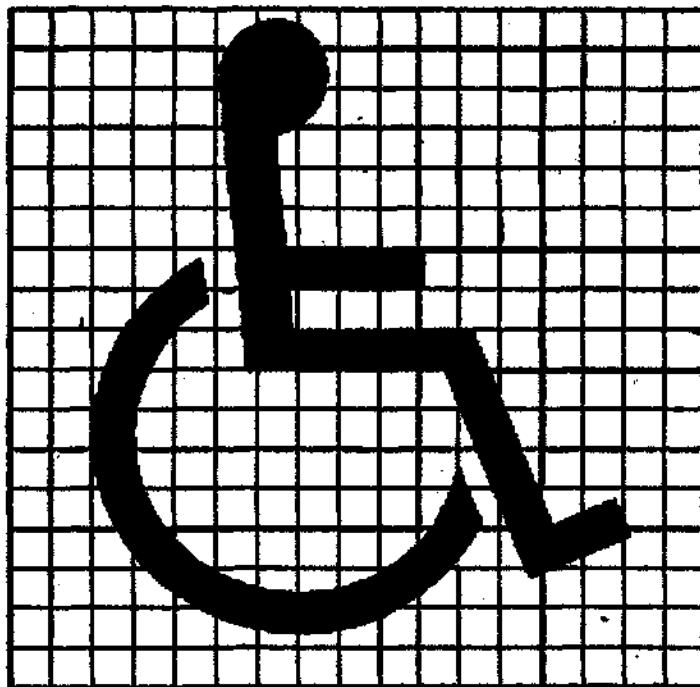
- The Symbol should consist of two elements, namely a symbolised figure in a wheelchair and a plain square background;
- The proportional
- The colour of the figure should be white on a blue background; and
- The Symbolised figure should face to the right.



12.8.2. The Symbol should be displayed:-

- Outside the building to identify buildings with accessible facilities; and
- At areas where facilities are provided for people with disabilities.

12.8.3. The Symbol should be used to identify accessible features and facilities by people with disabilities but should not be limited to the wheelchair users.



**International Symbol of Access**

*(The background squares are for reference only)*