

CENTRE AUDIT MANUAL FOR CENTER INSPECTOR/AUDITOR

INTRODUCTION

Barrier Free Environment is one which enables people with disabilities to move about safely and freely and to use the facilities within the built environment. The goal of barrier free design is to provide an environment that supports the independent functioning of individuals so that they can get to, and participate without assistance in training and employment.



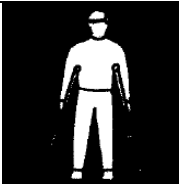

The fundamental principles which have been followed in developing standards/ norms for various training and employment facilities to meet disabled people's standards for safety, convenience and usability. Barrier free design standards should satisfy anyone who is hampered in his mobility or functioning (as compared with a nondisabled person) as a result of obstacles put in his way by the design of a building, the choice of hardware and equipment, and the arrangement of outside space.

The primary objective of this checklist is to frame guidelines for non-ambulant (chair bound), semi-ambulant (lower limb impairments), visual, and hearing disabled persons. This construction and maintenance standard should be followed in all categories of buildings and facilities used by the TP for making accessible to and functional for physically disabled persons.

The standard also indicates that barrier free design can be achieved without economic burden to TP/ Employer. It will help to provide framework for developing policies to ensure a barrier free environment and eliminate the lack of awareness in both the public and private sectors to the problem of accessibility.

TYPE OF DISABILITIES

Various, disabilities which have been considered while preparing the guidelines for barrier free built environment are broadly classified under four categories:

| | | | |
|--|---|---|---|
| 1. Non-Ambulatory: Impairments that, regardless of cause or manifestation, for all practical purposes, confine individuals to wheel & chairs. |  | 2. Semi-Ambulatory: Impairments that cause individuals to walk with difficulty or insecurity. Individual using braces or crutches, amputees, arthritics, spastics & those with pulmonary & cardiac ills may be semi-ambulatory. |  |
| 3. Sight: Total blindness or impairments affecting sight to the extent that the individual functioning in public areas is insecure or exposed to danger. |  | 4. Hearing: Deafness or hearing handicaps that might make an individual insecure in public areas because he is unable to communicate or hear warning signals. |  |

MOBILITY DEVICES

RECOMMENDATION:

Adequate space for persons using mobility devices

- Adequate space should be allocated for persons using mobility devices, e.g. wheelchairs, crutches and walkers, as well as those walking with the assistance of other persons (Fig. 1, 2 and 7).
- The range of reach (forward and side; with or without obstruction) of a person in a wheelchair should be taken into consideration (Fig. 3, 4, 5 and 6).

- Attention should be given to dimensions of wheelchairs used locally. Standard size of wheel chair has been taken as 1050mm x 750mm (as per ISI).

WHEEL CHAIR

Training area must be obstruction free according to diagram below:

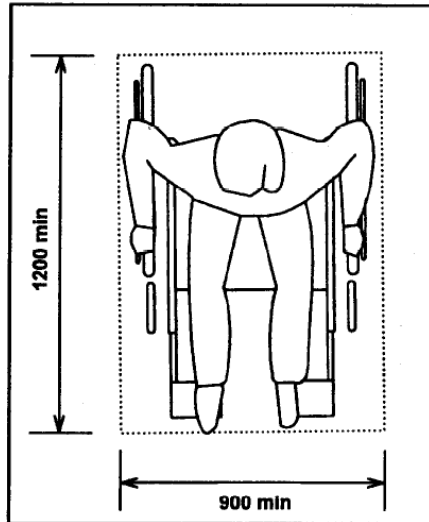


Fig.-1. Space Allowance

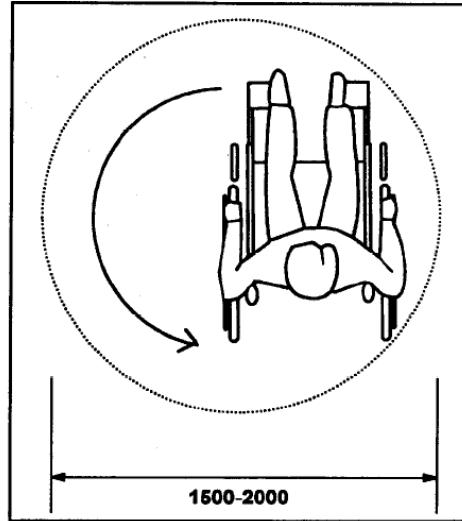


Fig.-2. Space Allowance

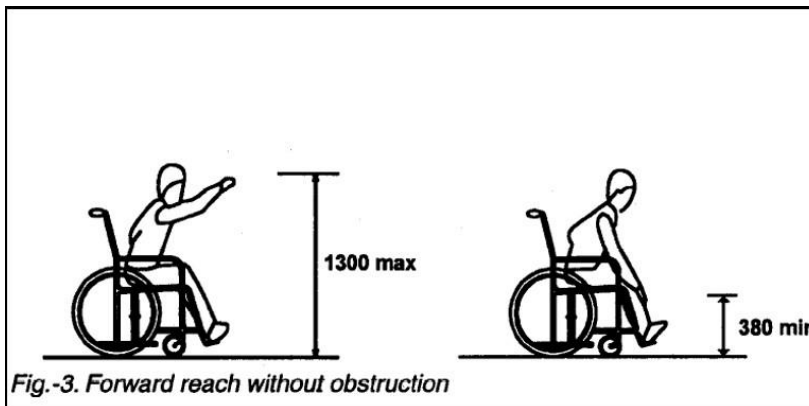


Fig.-3. Forward reach without obstruction

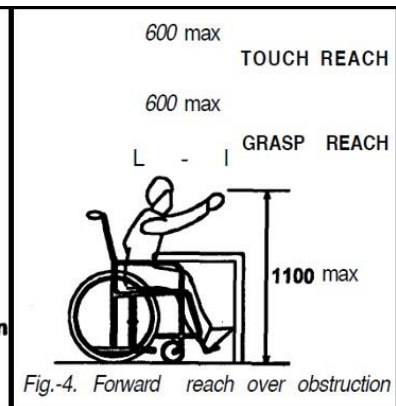


Fig.-4. Forward reach over obstruction

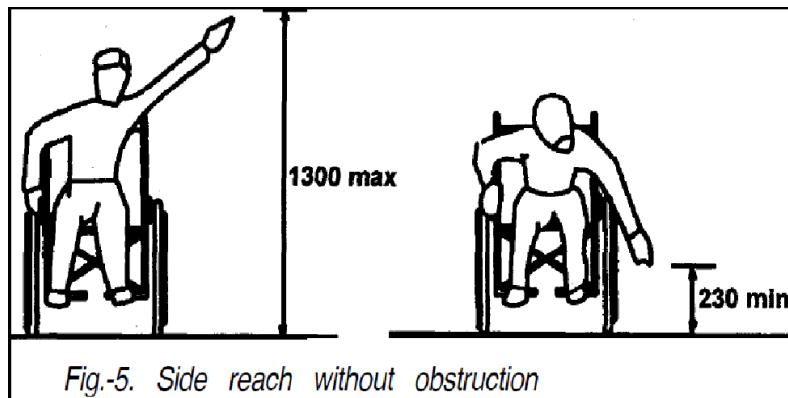


Fig.-5. Side reach without obstruction

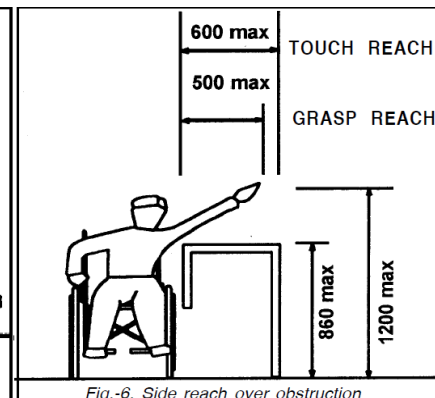
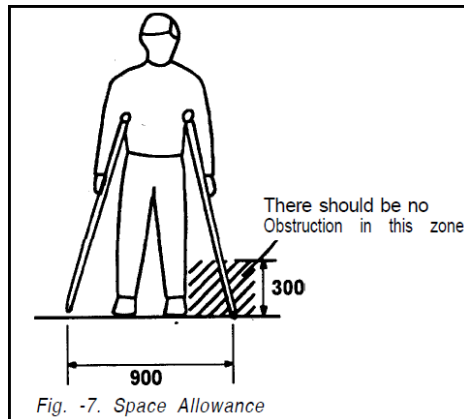
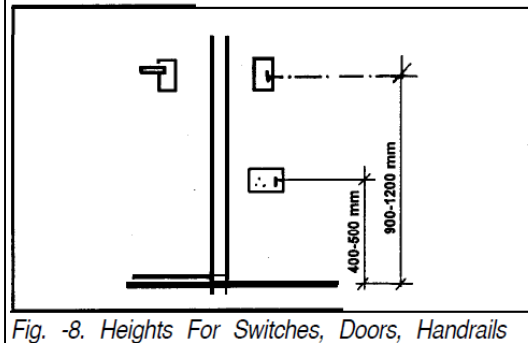


Fig.-6. Side reach over obstruction

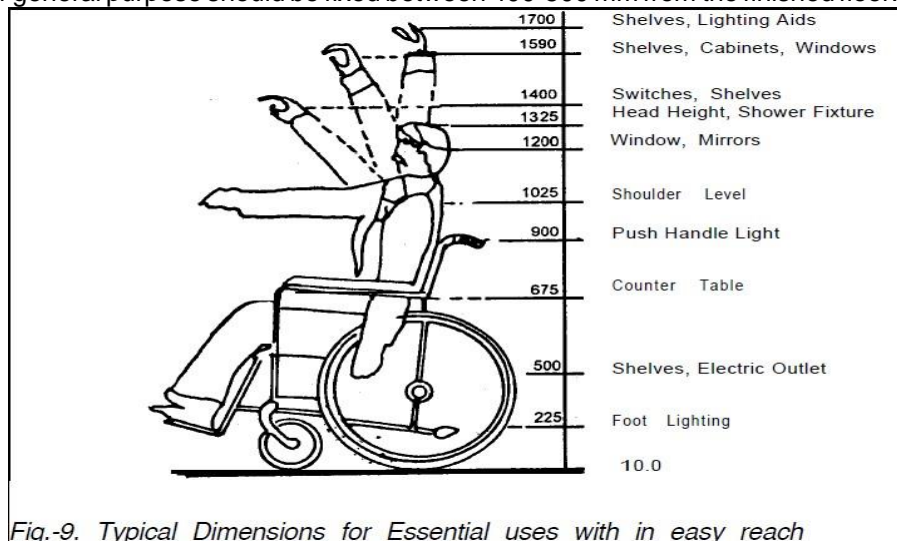


Controls



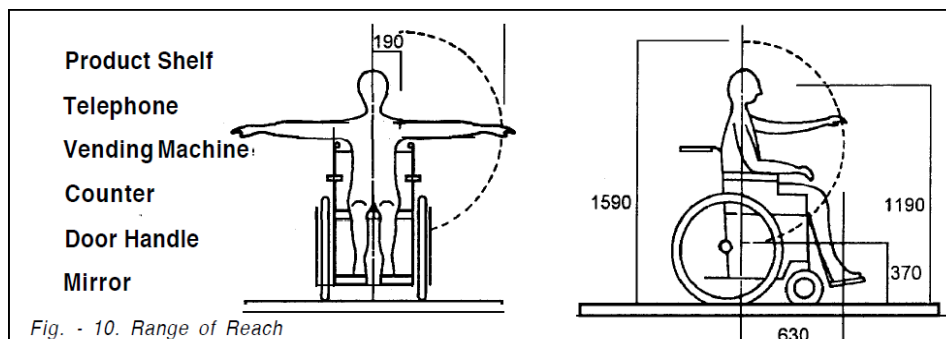
CONTROLS

- For locking and opening controls for window and doors should not be more than 1400mm from the finished floor usable by one hand.
- Switches for electric light and power as well as door handles and other fixtures and fittings should be between 900 mm - 1200 mm from finished floor.
- Power point for general purpose should be fixed between 400-500 mm from the finished floor.



RANGE OF REACH

- A wheelchair user's movement pivots around his or her shoulders. Therefore, the range of reach is limited, approximately 630 mm for an adult male.
- While sitting in a wheelchair, the height of the eyes from the floor is about 1190 mm for an adult male.



A wheelchair has a footplate and leg rest attached in front of the seat. (The footplate extends about 350 mm in front of the knee). The footplate may prevent a wheelchair user from getting close enough to an object.

- Manually operated equipment must be designed to be easily accessible from a wheelchair.
- Make sure that the coin slots of vending machines etc. are located no higher than 1200 mm.
- Allow a space at least 350 mm deep and 700 mm high under a counter, stand, etc.

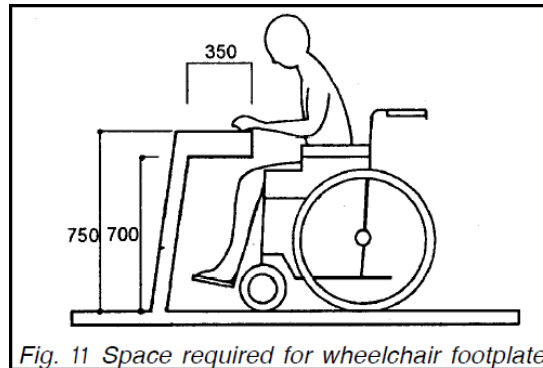


Fig. 11 Space required for wheelchair footplate

DISABILITIES

A. NON-AMBULATORY DISABILITIES

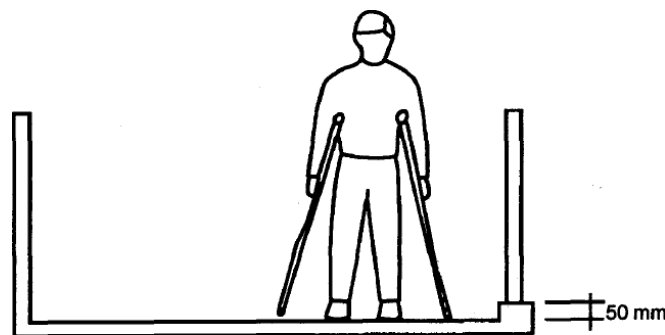
Persons restricted on wheel chair should use the facilities within the built environment alone without a helper's assistance.

B. SEMI-AMBULATORY DISABILITIES (Persons with impaired walking)

Persons in this category who use walking aids such as crutches or canes, who are amputees, who have chest ailments or heart disease. The persons in this category include those who cannot walk without a cane and those who have some trouble in their upper or lower limbs although they can walk unassisted.

Design requirements

- Width of passage for crutch users (min. 900 mm)
- Finishes of floor surface with non slip floor material.
- Installation of handrail to support the body weight at the critical places e.g. staircase, toilet, ramp, passage with a change of level (800-850 mm).
- Extension of handrail on the flat landing at the top and bottom of the stairs (300 mm).
- To prevent slipping off the cane or crutch from the side of the stairs or ramps (20 mm high lip on the exposed edge).



Shape of passage

To prevent a cane or crutch tip from slipping off the side of the stairs or ramp, install a 20 mm high lip on the exposed edge.

C. SIGHT DISABILITY (Persons with impaired vision)

Persons in this category are totally blind or with impaired vision. Visually impaired persons make use of other senses such as hearing or touch to compensate for the lack of vision. It is necessary to give instructions accessible through the sense of touch (hands, fingers or legs).

While walking with a white cane to spot their feet near the tip of the cane the persons may bump his or her head or shoulder against protruding objects.

Persons with limited vision may be able to discriminate between dark and bright shades and difference in primary colors.

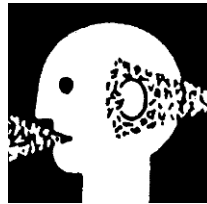


Design requirements

- Use of guiding blocks for persons with impaired vision to guide them within the buildings and facilities and outside the building.
- Installation of information board in braille.
- Installation of audible signages (announcements)
- Removal of any protruding objects and sufficient walking space for safe walking.
- For persons with limited vision use of contrasting color arrangements

D. HEARING DISABILITIES (Persons with impaired hearing)

Persons in this category are totally deaf or have difficulty in hearing. They are generally use their sight to gather information in public places.



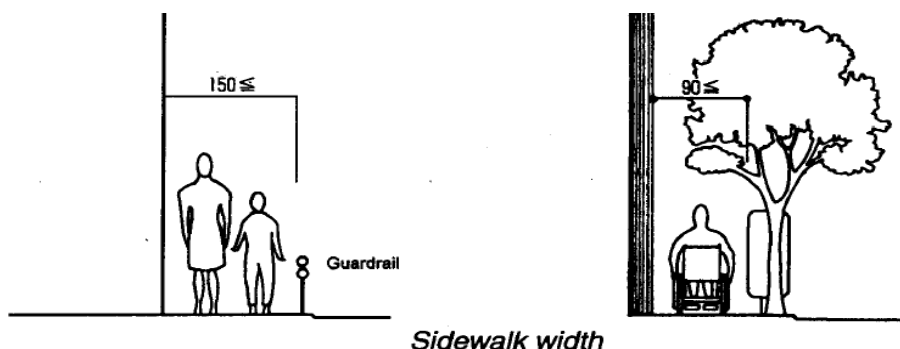
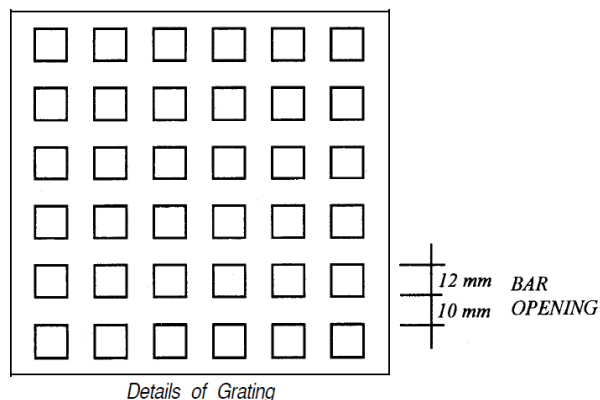
Design requirements

- Provision of information board in an easily understandable manner.
- Provision of illuminated signages, layout diagrams to help the persons easily reach the desired place.

APPROACH TO TRAINING CENTRE/ INDUSTRY

WALKS AND PATHS

- Walks should be smooth, hard level surface suitable for walking and wheeling. Irregular surfaces as cobble stones, coarsely exposed aggregate concrete, bricks etc. often cause bumpy rides.
- The minimum walk way width would be 1200 mm and for moderate two way traffic it should be 1650 .mm - 1800 mm.
- Longitudinal walk gradient should be 3 to 5% (30 mm - 50 mm in 1 meter)
- When walks exceed 60 Meter in length it is desirable to provide rest area adjacent to the walk at convenient intervals with space for bench seats. For comfort the seat should be between 350 mm - 425 mm high but not over 450 mm.
- Texture change in walk ways adjacent to seating will be desirable for blind persons.
- Avoid grates and manholes in walks. If grates cannot be avoided, then bearing bar should be perpendicular to the travel path and no opening between bearing bars greater than 12 mm in width.



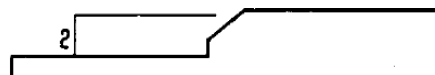
LEVELS AND GROOVES

(Passing over different levels and grooves)

- The casters on a wheelchair are about 180 mm in diameter. Therefore, a wheelchair can only get over a small level difference.
- Use a method that can reduce the height of the level difference, in addition to the methods shown here.



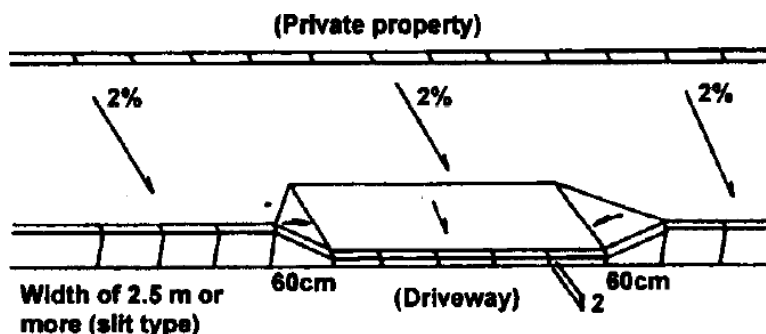
Difference in level



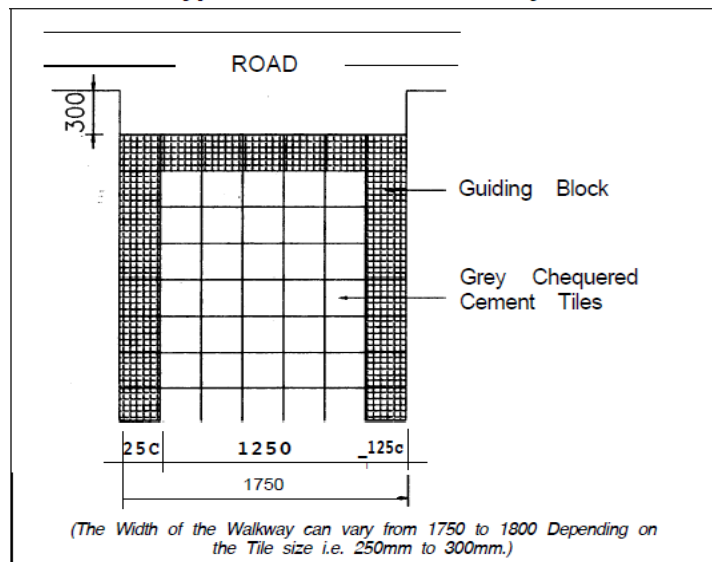
Shape of level difference

- It can be difficult to move a wheelchair if a caster is caught in a groove.
 - It is desirable that there is no difference in level. (If a difference is unavoidable, limit it to 20 mm or less)
 - Round off or bevel the edge.
 - To prevent a wheelchair from getting its casters caught in a drainage ditch or other cover.
 - Install grating with narrow slots in the direction of movement.
 - Treat the grating with a non-slip finish.
 - Reduce the gap between an elevator floor and the landing.

KERB RAMP

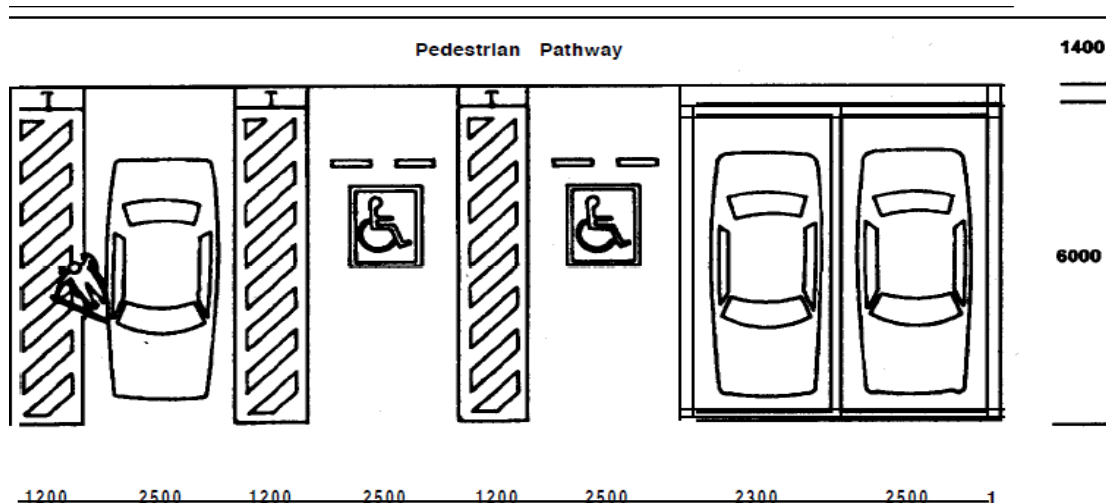


Typical Detail of Walkway



Note:

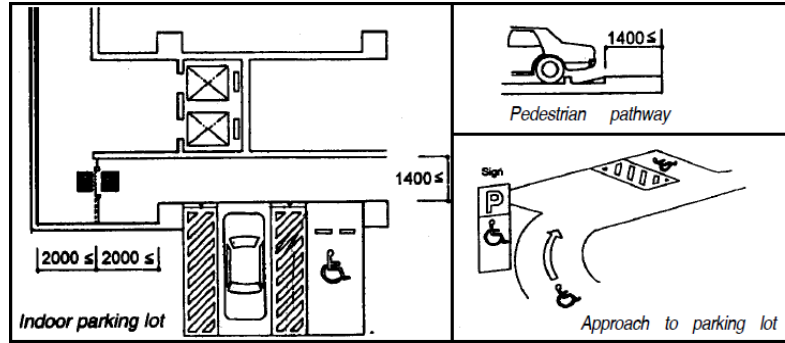
- Walkway should be constructed with a non-slip material & different from rest of the area.
- The walkway should not cross vehicular traffic.
- The manhole, tree or any other obstructions in the walkway should be avoided.
- Guiding block at the starting of walkway & finishing of the walkway should be provided.
- Guiding block-can be of red chequered tile, smooth rubble finish, prima regina, Naveen tiles or any other material with a different texture as compared to the rest of the area.



PARKING

For parking of vehicles of handicapped people the following provisions shall be made:

- Surface parking for two care spaces shall be provided near entrance for the physically challenged persons with maximum travel distance of 30 M from building entrance.
- The width of parking bay shall be minimum 3.60 Meter.
- The information stating that the space is reserved for wheel chair users shall be conspicuously displayed.
- Guiding floor materials shall be provided or a device which guides visually impaired persons with audible signals or other devices which serves the same purpose shall be provided.



APPROACH TO PLINTH LEVEL

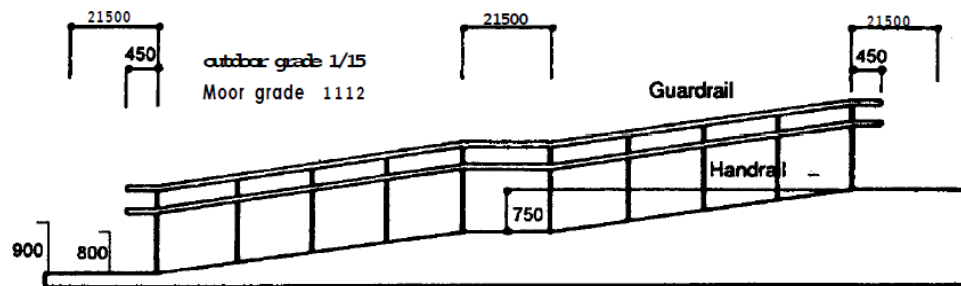
Approach to plinth level:

Every building should have at least one entrance accessible to the PwD and shall be indicated by proper signage. This entrance shall be approached through a ramp together with the stepped entry.

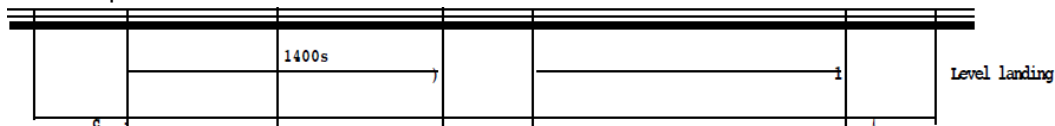
Ramped Approach:

Ramp shall be finished with non-slip material to enter the building. Minimum width of ramp shall be 1800 mm. with maximum gradient 1:12, length of ramp shall not exceed 9.0 M having double handrail at a height of 800 and 900 mm on both sides extending 300 mm. beyond top and bottom of the ramp. Minimum gap from the adjacent wall to the hand rail shall be 50 mm.

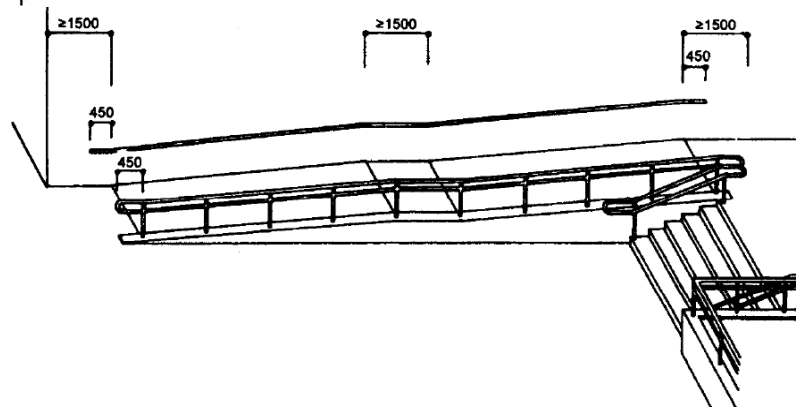
1. Side elevation of ramp



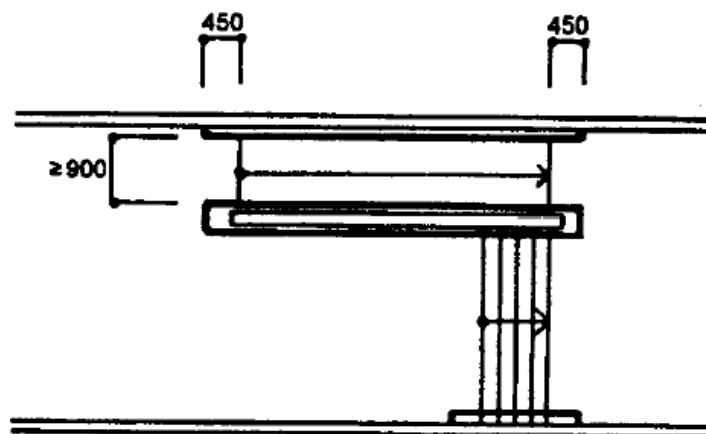
2. Plan view of ramp



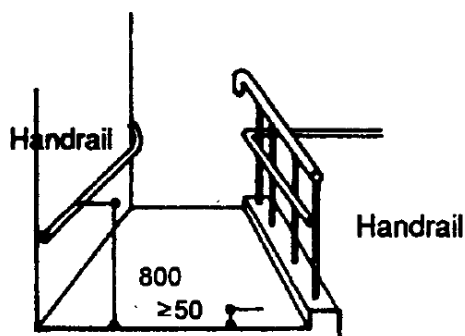
3. Overall view of ramp



4. Ramp combined with staircase

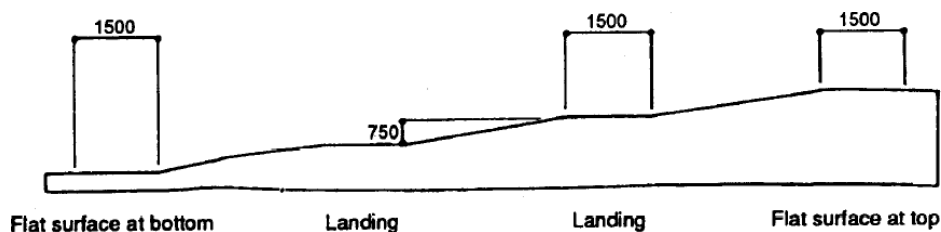


5. Rise



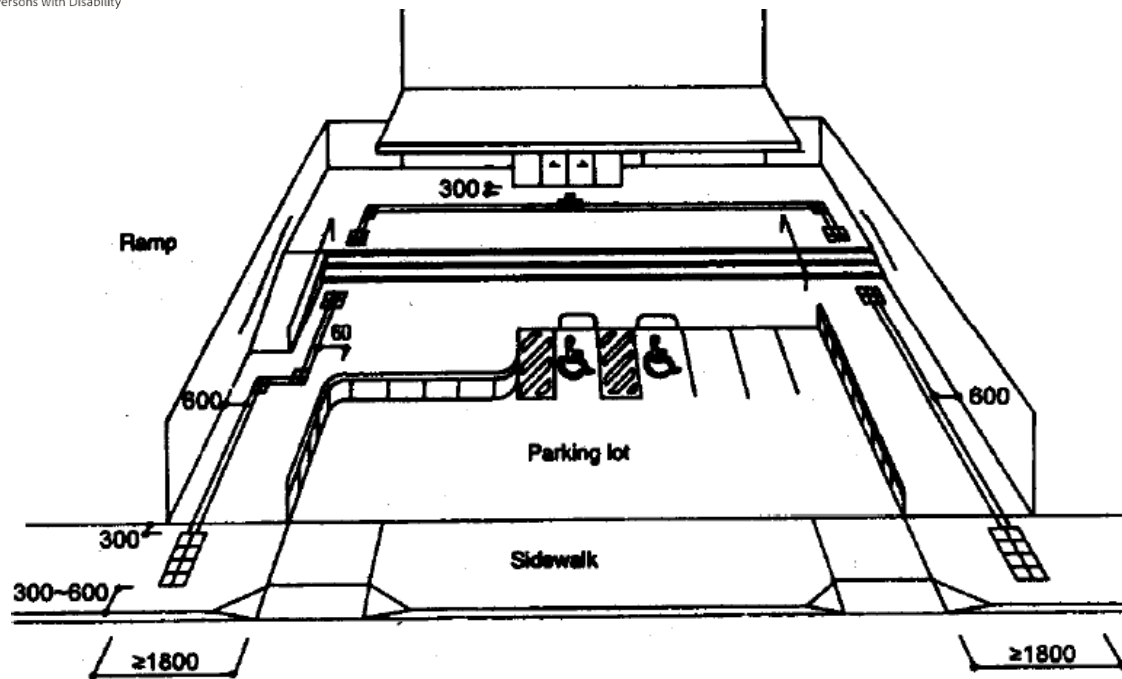
CROSS SECTION OF RAMP

- When climbing a ramp in a wheelchair, the upper limbs must bear the burden of propelling the body up the ramp.
- When descending a ramp in a wheelchair, especially on steep ramps, there is a possibility of the wheelchair running out of control because the user must manually control the speed.
- Prevent the installation of steep ramps.
 - a) Make sure the grade of a ramp is a moderate rise of 10 mm to each 120 mm of travel.
 - b) Provide a flat surface 1500 mm or more in length at the top and bottom of the ramp for a wheelchair to pause and prevent it from going out of control.

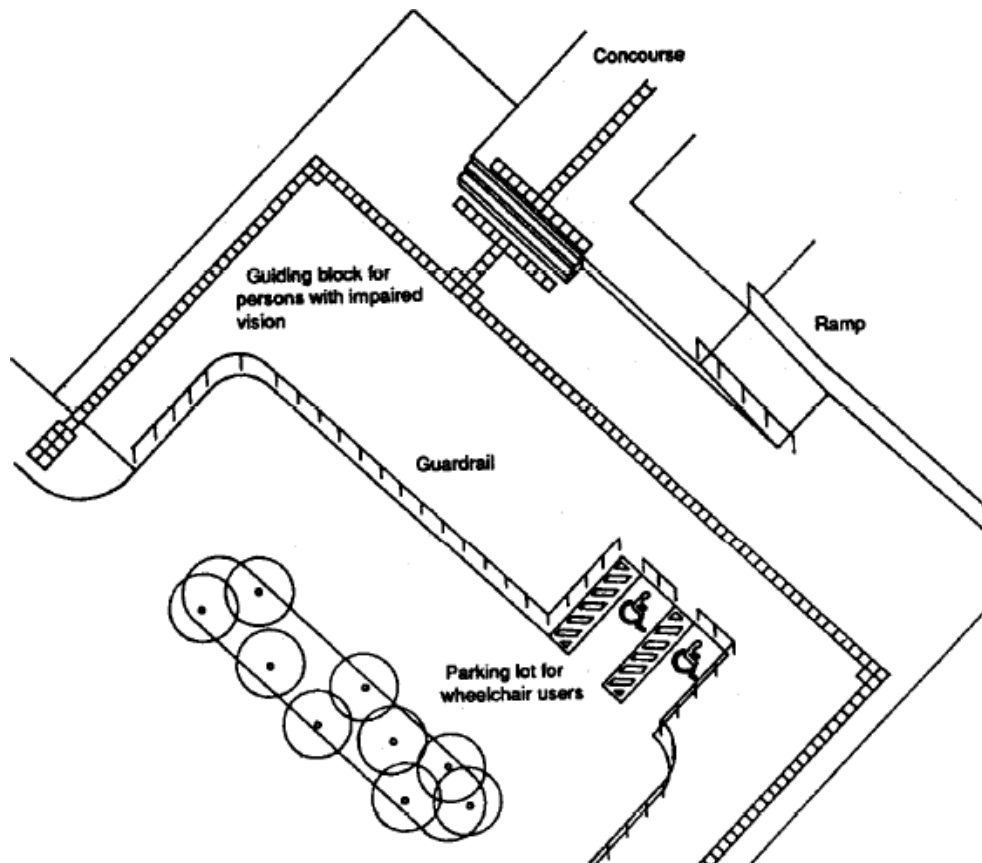


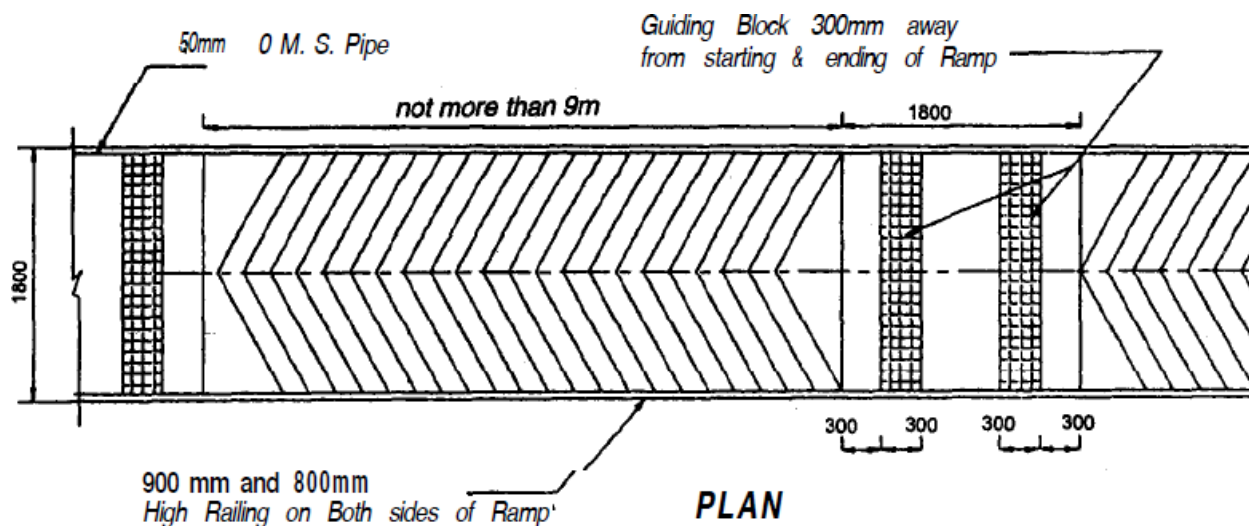
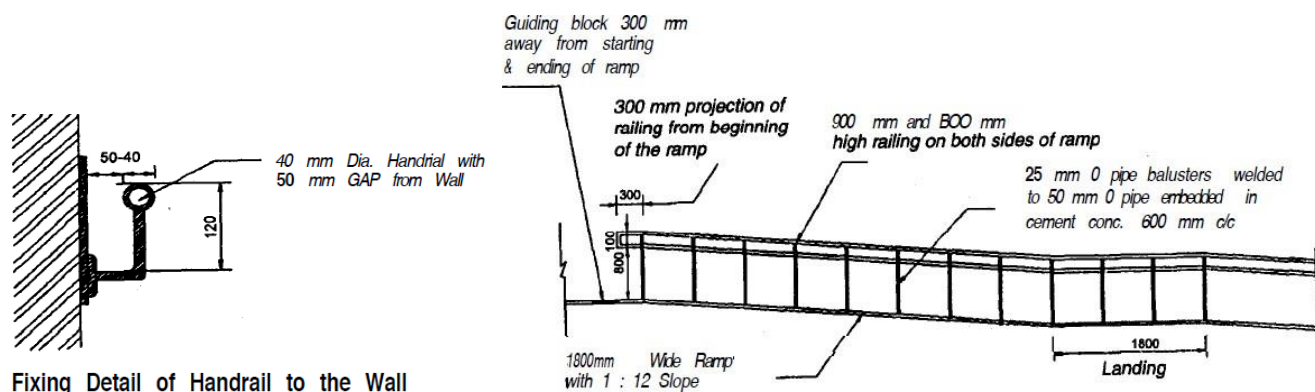
Stepped Approach:

For stepped approach size of tread shall not be less than 300 mm. and maximum riser shall be 150 mm. Provision of 900 mm high hand rail on both sides of the stepped approach similar to the ramped approach.

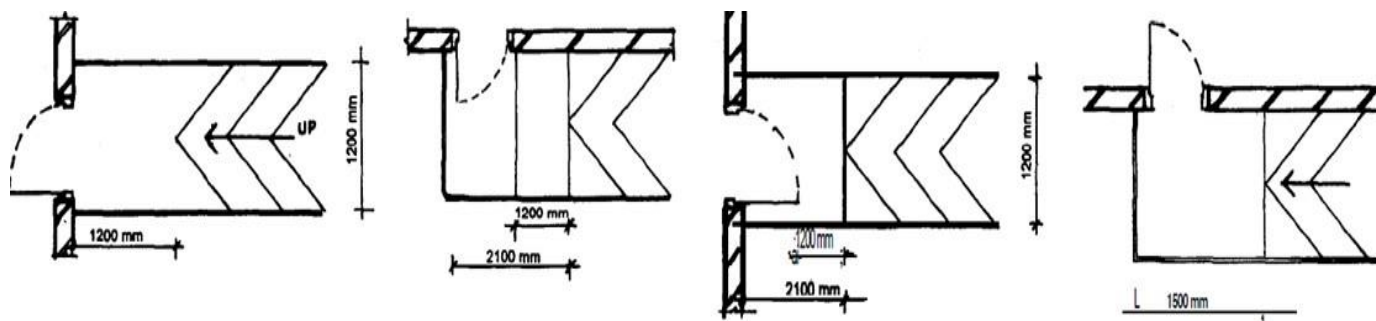


Overall view of approach

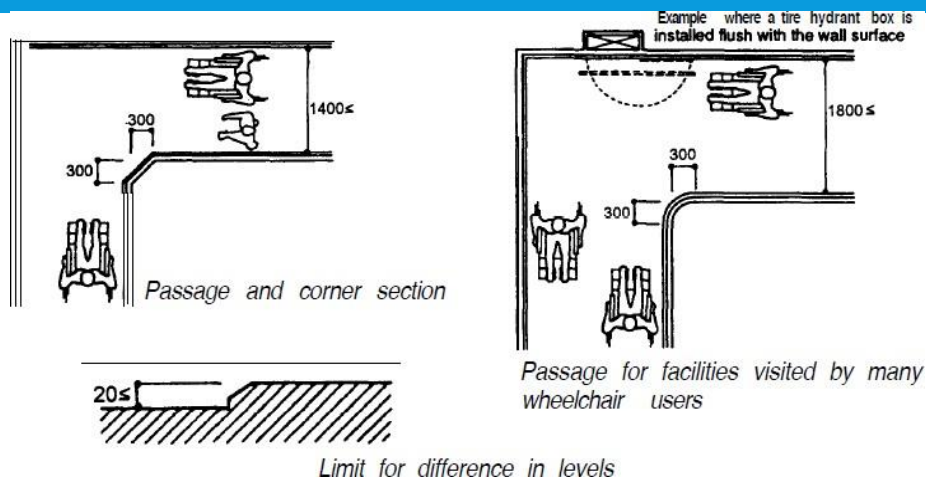




Entrance landing shall be provided adjacent to ramp with the minimum dimension 1800 x 2000 mm. The entrance landing that adjoin the top end of a slope shall be provided with floor materials to attract the attention of visually impaired persons (limited to coloured floor material whose color and brightness is conspicuously different from that of the surrounding floor material or the material that emit different sound to guide visually impaired persons hereinafter referred to as “guiding floor material”. Finishes shall have a non-slip surface with a texture traversable by a wheel chair. Curbs wherever provided should blend to a common level.



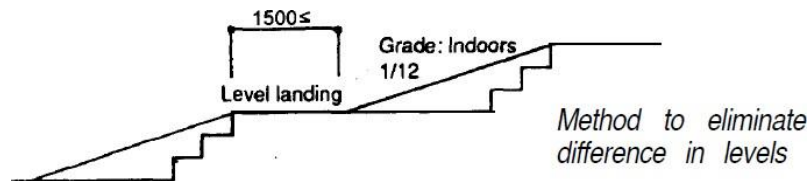
CORRIDOR



Corridor connecting the entrance/exit for the PwDs:

The corridor connecting the entrance/exit for handicapped leading directly outdoors to a place where information concerning the overall use of the specified building can be provided to visually impaired persons either by a person or by signs, shall be provided as follows:

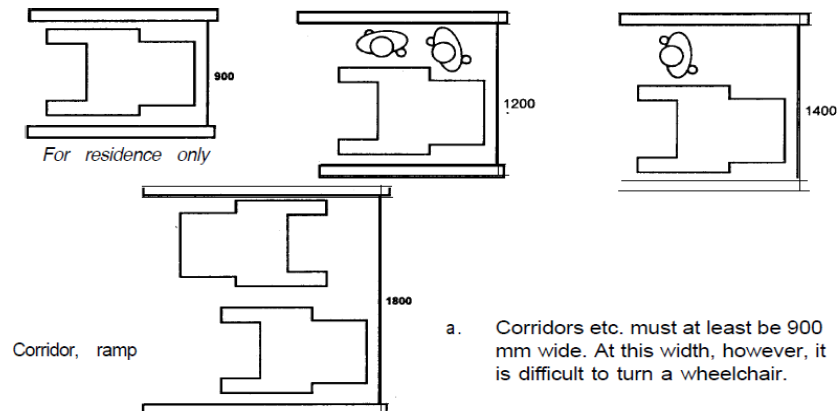
- 'Guiding floor materials' shall be provided or devices that emit sound to guide visually impaired persons.
- The minimum width shall be 1500 mm.
- In case there is a difference of level slope ways shall be provided with a slope of 1:12.
- Hand rails shall be provided for ramps/slope ways.



REQUIRED WIDTH FOR PASSAGE OF WHEELCHAIR

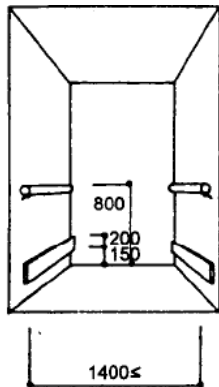
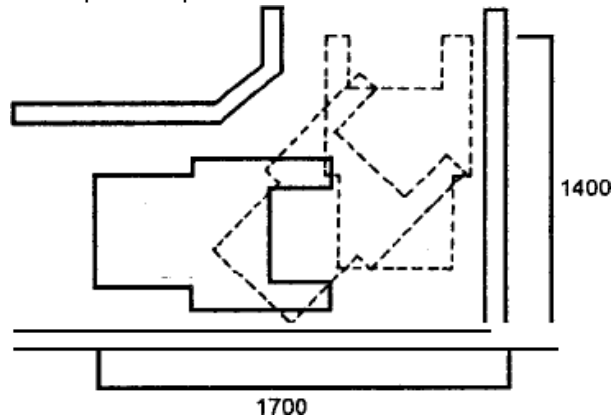
1. The wheelchair body itself is about 650 mm wide. Allowing for the use of hands and arms outside the wheelchair, the passage must be as wide as 900 mm or more.
2. Locations such as entrances and exits can be 900 mm wide. However, a continuous passage (e.g. a corridor) must at least be 900 mm wide to allow for slight side-to-side movement of the wheelchair as it travels.

Required width for Passage of Wheelchair

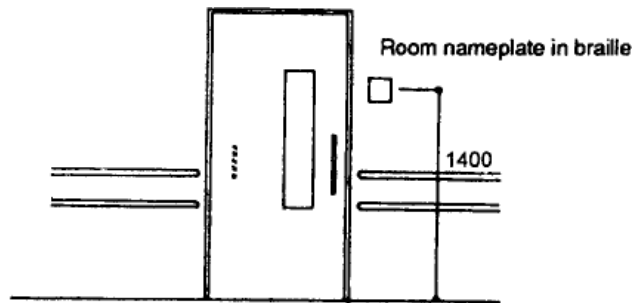


REQUIRED WIDTH TO TURN A WHEELCHAIR

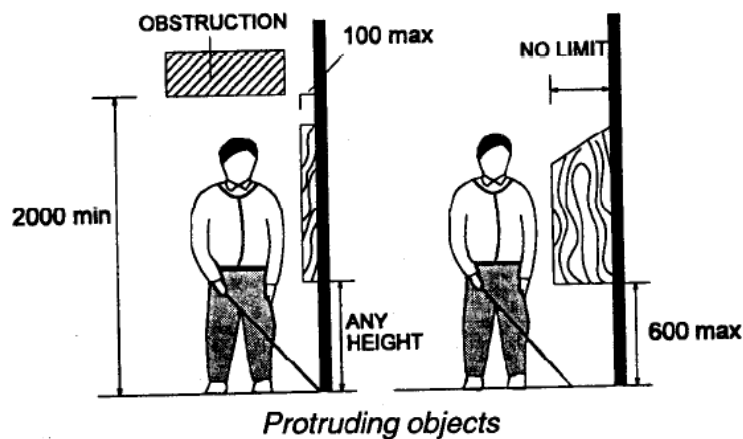
The diagram on the right shows the space required to turn a wheelchair.



Cross section of corridor Room entrance/exit and surroundings



Hand rail

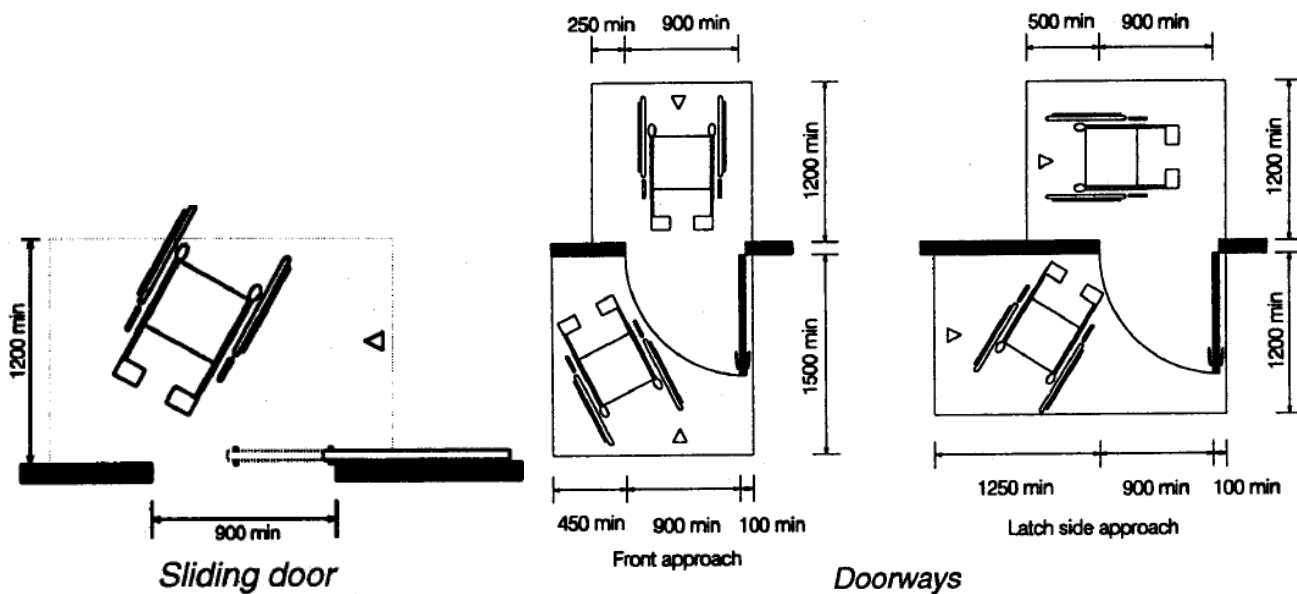
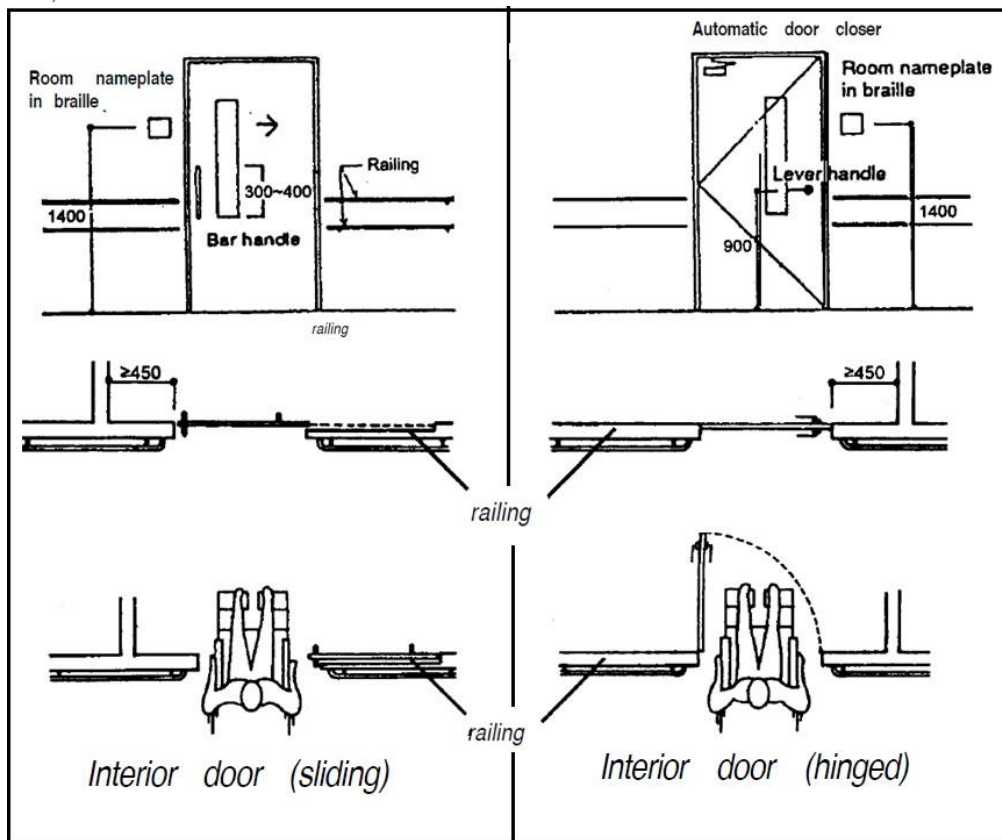


Protruding objects

ENTRANCE/ EXIT DOOR

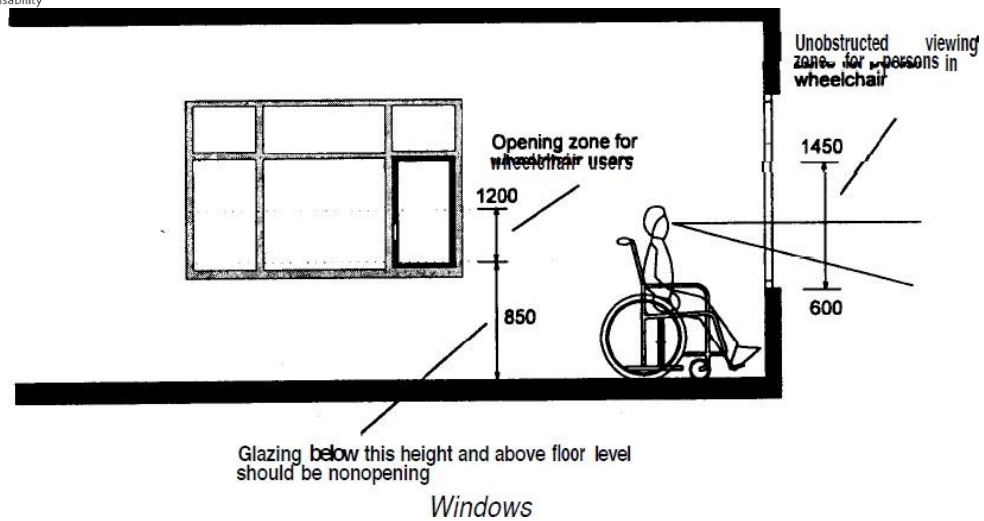
Exit/Entrance Door:

Minimum clear opening of the entrance door shall be 900 mm. and it shall not be provided with a step that obstructs the passage of a wheel chair user. Threshold shall not be raised more than 12 mm.

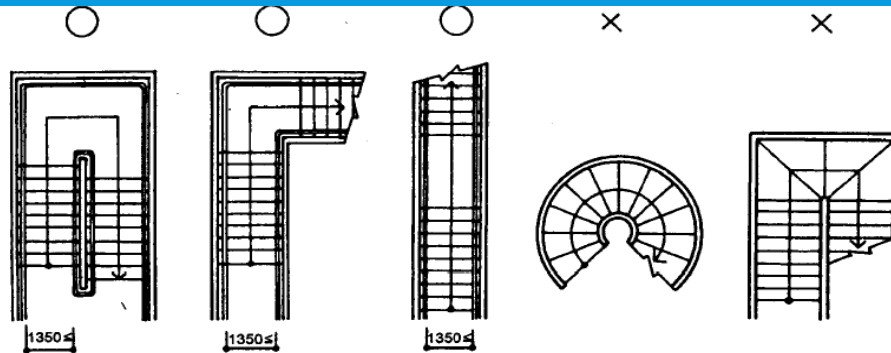


WINDOWS

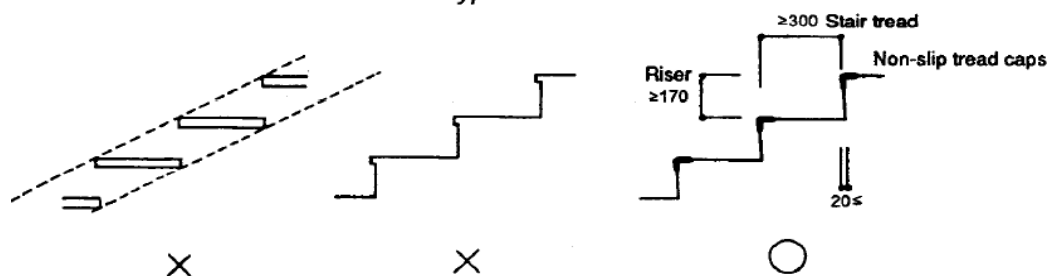
- A window should have handies/ controls at a height that permits use from wheelchairs.
- A window should have an unobstructed viewing zone for wheelchair users.
- Curtain or Venetian blind controls/ropes should be accessible for wheelchair users.



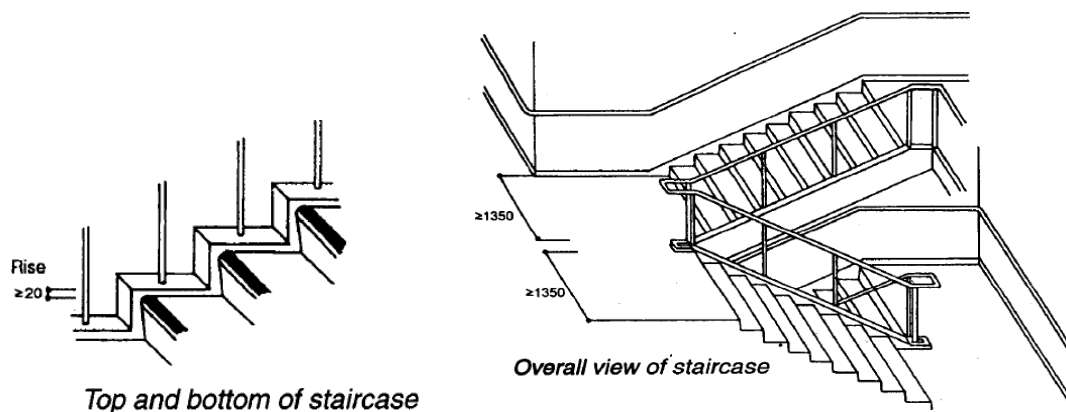
STEPS AND STAIRS



Types of staircases

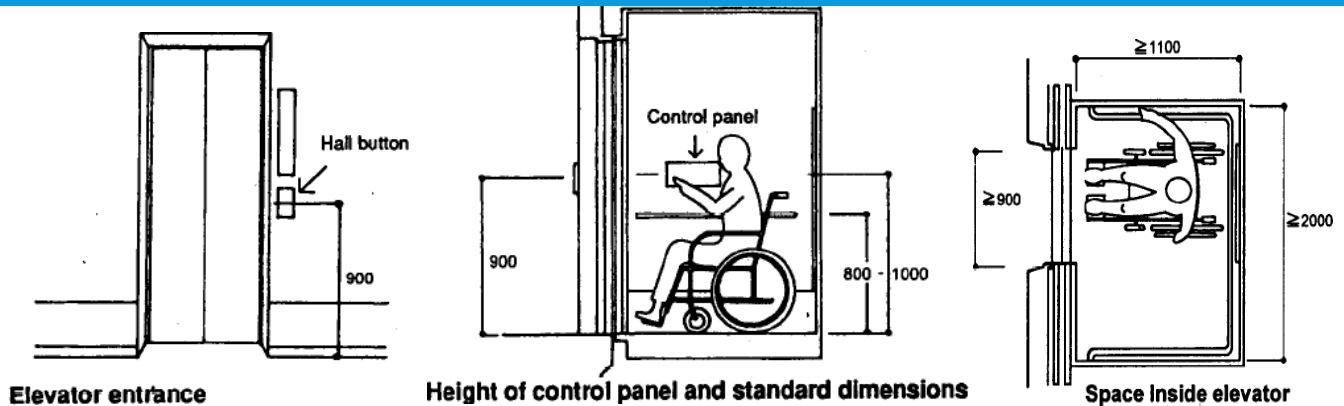


Stair dimensions



Top and bottom of staircase

LIFT



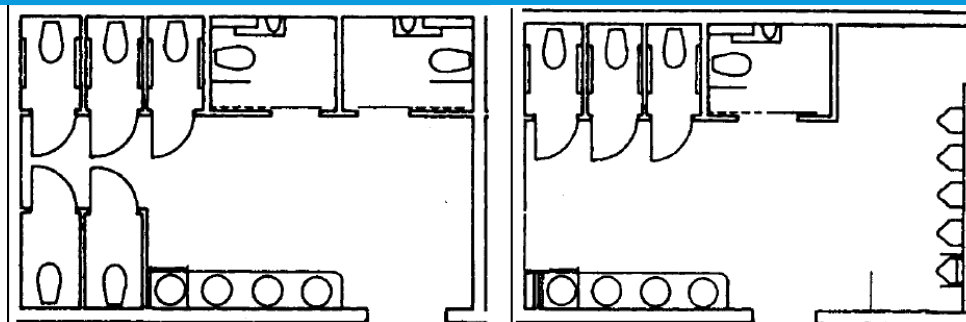
Lifts:

Wherever lift is required as per bye-laws, provision of at least one lift shall be made for the wheel chair user with the following cage dimensions of lift recommended for passenger lift of 13 person's capacity by Bureau of Indian Standards.

Clear internal depth : 1100 mm.
 Clear internal width : 2000 mm.
 Entrance door width : 900 mm.

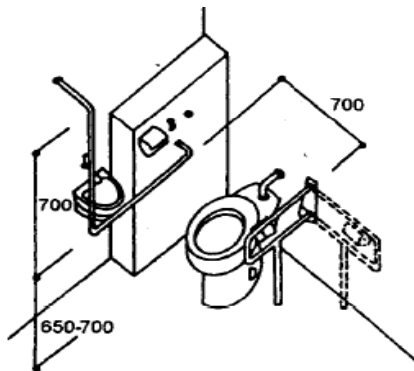
- A hand rail not less than 600 mm. long at 800-1000 mm. above floor level shall be fixed adjacent to the control panel.
- The lift lobby shall be of an inside measurement of 1800 x 1800 mm. or more.
- The time of an automatically closing door should be minimum 5 seconds and the closing speed should not exceed 0.25 M/ Sec.
- The interior of the cage shall be provided with a device that audibly indicates the floor the cage has reached and indicates that the door of the cage for entrance/exit is either open or closed.

TOILET

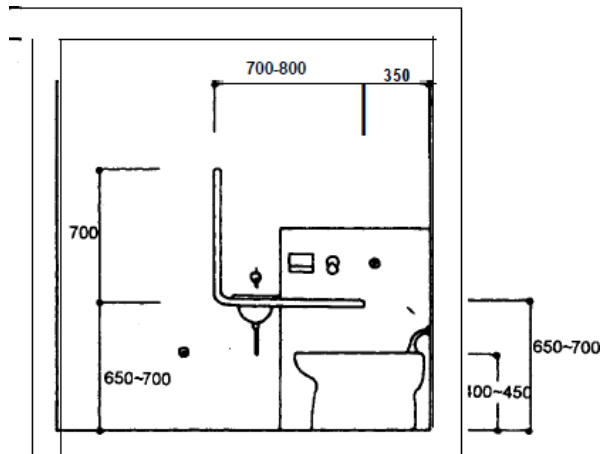


One special W.C. in a set of toilet shall be provided for the use of PwD with essential provision of wash basin near the entrance for them.

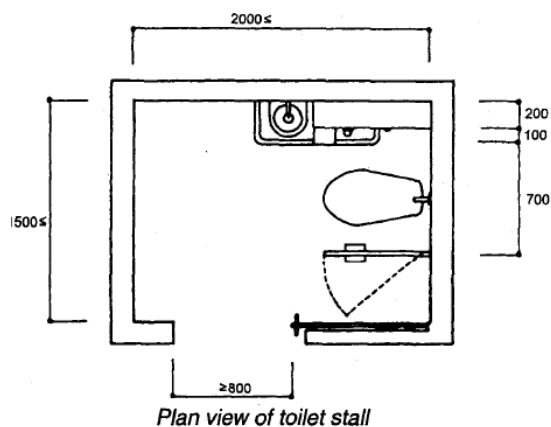
- The minimum size shall be 1500 x 1750 mm.
- Minimum clear opening of the door shall be 900 mm. and the door shall swing out.
- Suitable arrangement of vertical/horizontal handrails with 50 mm. clearance from wall shall be made in the toilet.
- The W.C. seat shall be 500 mm. from the floor.



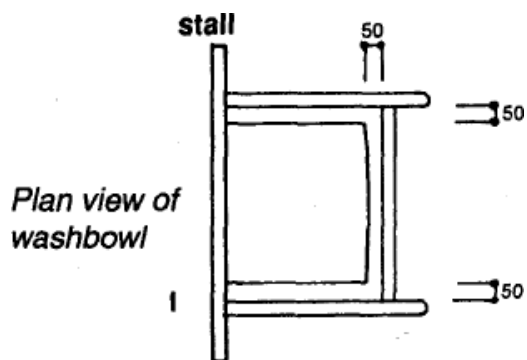
Handrail (Inside stall)



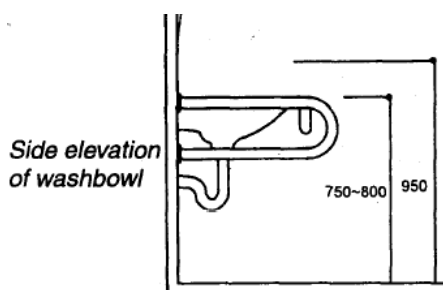
Side elevation of toilet stall



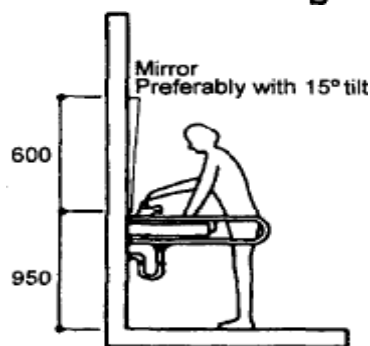
Plan view of toilet stall



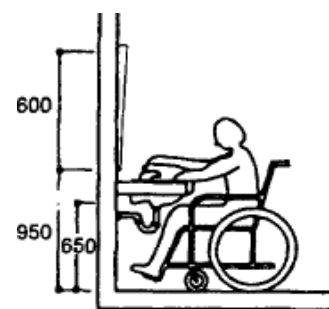
Plan view of washbowl



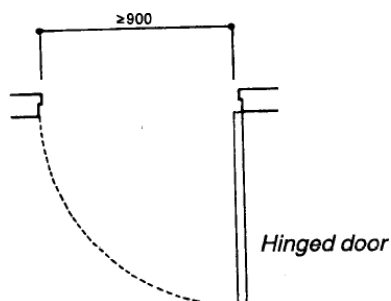
Side elevation of washbowl



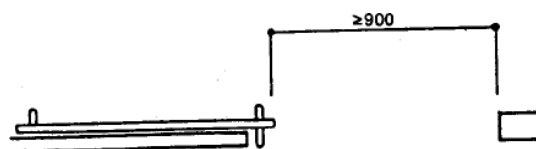
Use by a cane user



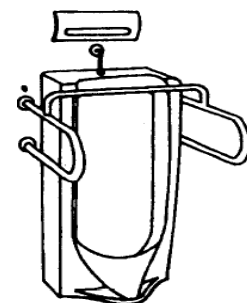
Use by a wheelchair user



Hinged door

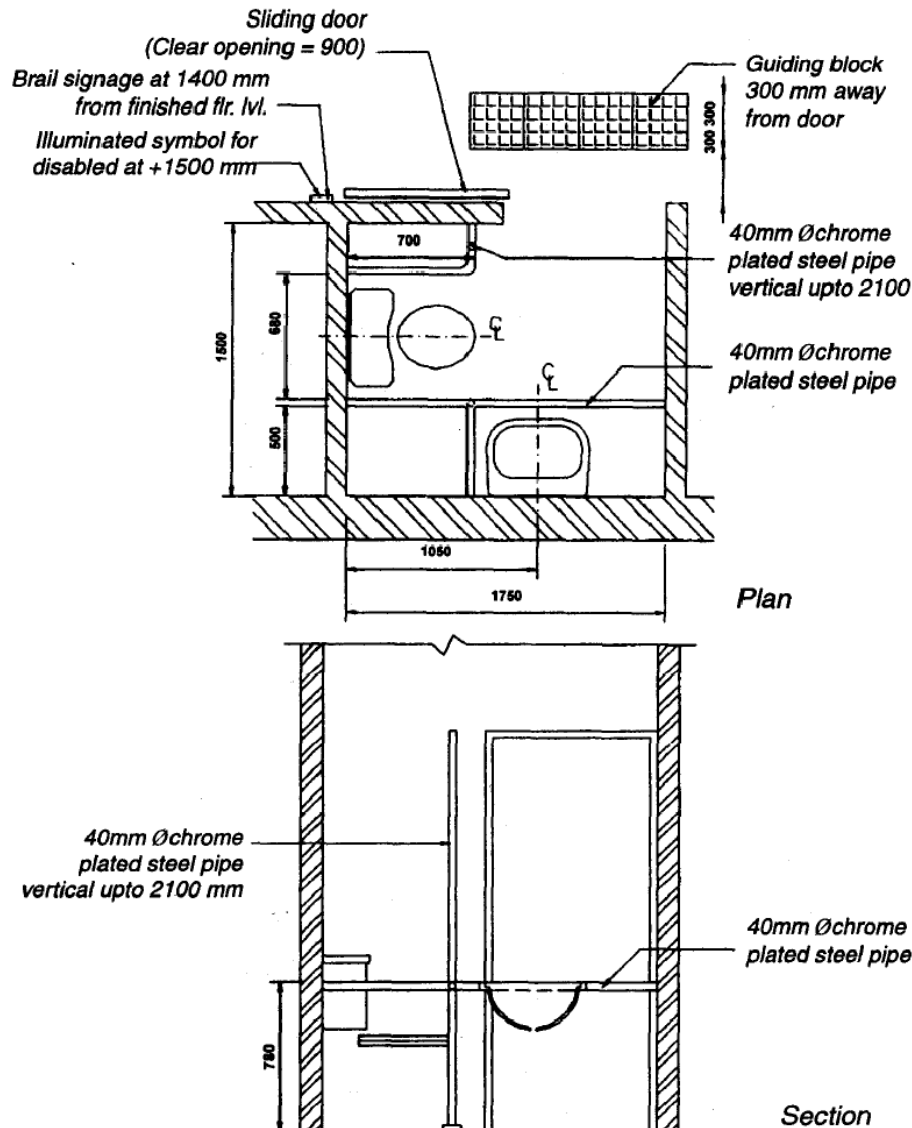


Sliding door



Urinal handrail

Typical Toilet

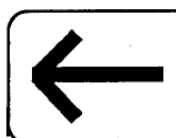


- Toilet floor shall have a non-slip surface without any lvl. difference.
- Guiding block near the entry should have a textural difference, (e.g. Diamon Tiles, Prima Regina Tiles, Undressed Granite)
- Light-weight PVC door shutter should be provided as a sliding door
- Provision of vertical & horizontal rail as 40 mm C.P. Steel Pipe.

SIGNAGES

The main purpose of signs should be to provide a clear designation of places, warnings and routing information. A person in a wheel chair is less than 1200 mm high. A person who is partially sighted needs contrasting texture along side walkways and audible signs for dangerous areas. Signs should **be** useful to everyone, easily seen from eye level, readable by moving the fingers and well lighted for night time identification.

- Signs shall indicate the direction and name of the accessible facility and incorporate the symbol of access.
- The size, type and layout of lettering on signs shall be clear and legible.



theater

Direction Identification

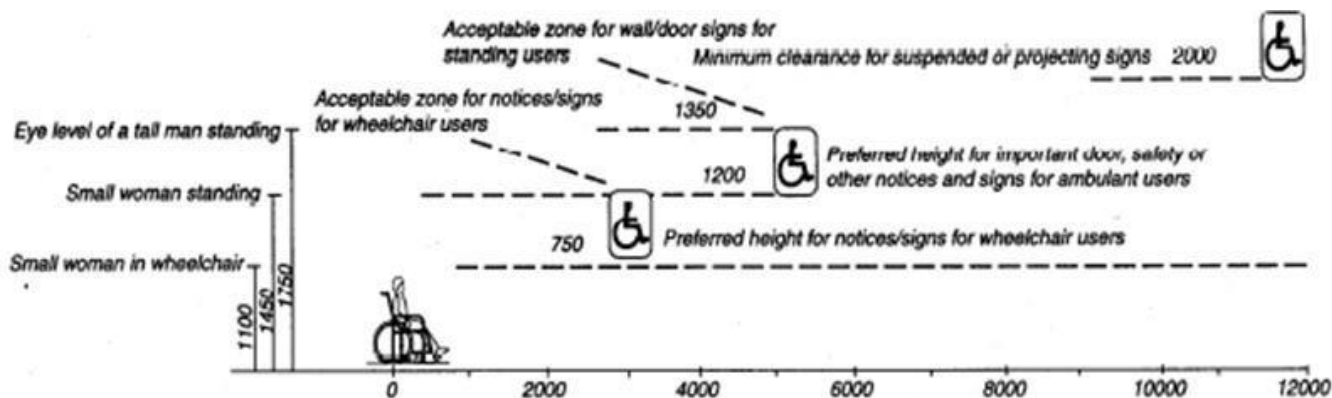
Information

'HEIGHT' OF LETTER FOR VARYING VIEWING DISTANCE

| Required viewing distance (M) | Minimum height of letters (MM) |
|-------------------------------|--------------------------------|
| 2 | 6 |
| 3 | 12 |
| 6 | 20 |
| 8 | 25 |
| 12 | 40 |
| 15 | 50 |
| 25 | 80 |
| 35 | 100 |
| 40 | 130 |
| 50 | 150 |

HEIGHT OF SYMBOL OF ACCESS FOR VARYING VIEWING DISTANCE

| Required viewing distance (M) | Minimum size of symbol (MM) |
|-------------------------------|-----------------------------|
| 0.7 | 60x60 |
| 7.18 | 110x110 |
| | Min. 200 x 200 |
| | Max. 450 x 450 |

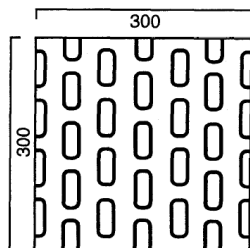
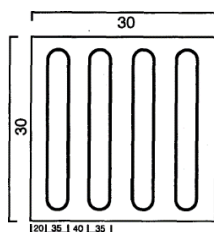


- Signs should be in contrasting colours and preferably be embossed in distinct relief to allow visually impaired persons to obtain the information they contain by touching them.
- Simple symbols and contrasting colours which are universally recognized should be used, e.g. green for safety or go, yellow or amber for risk or caution, and red for danger.

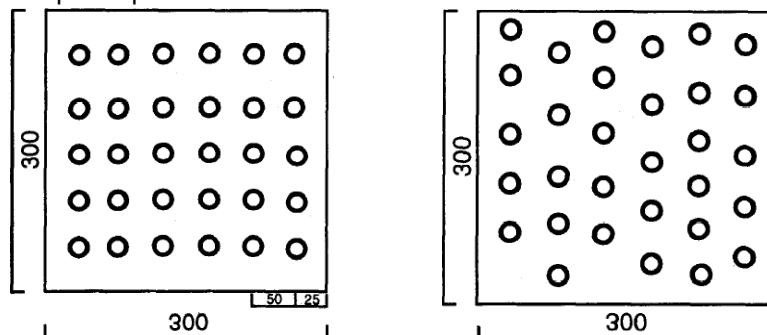
GUIDING/ WARNING FLOOR MATERIAL

Shapes of guiding blocks for persons with impaired vision

1. Shape of inner block

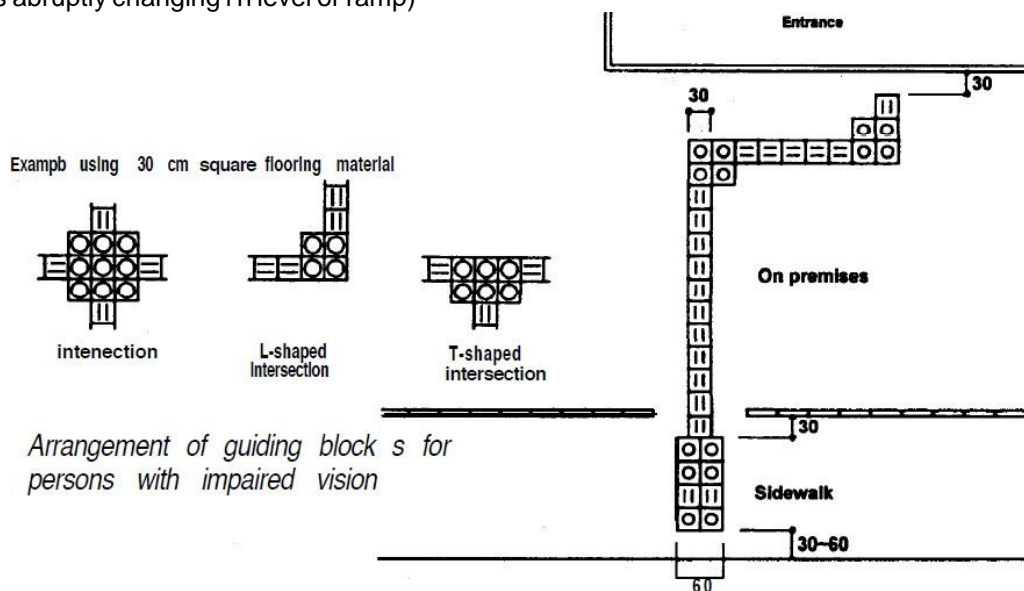


2. Shape of spot block

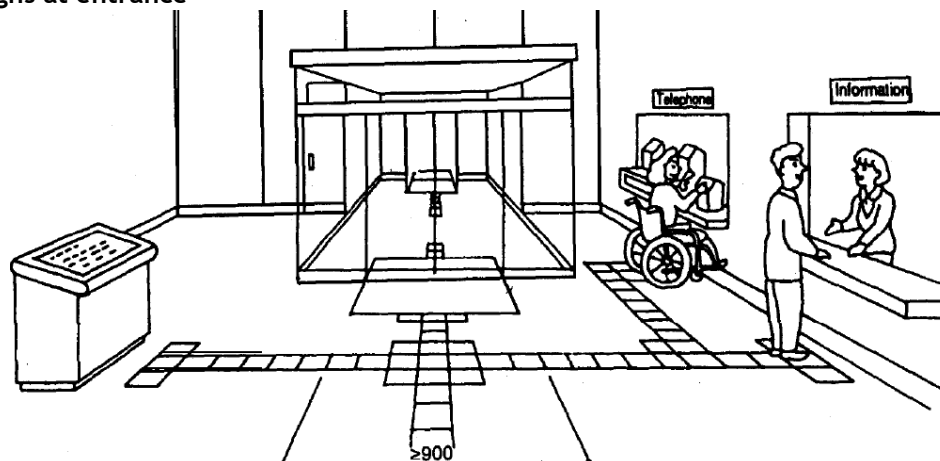


PLACES TO INSTALL GUIDING BLOCKS FOR PERSONS WITH IMPAIRED VISION

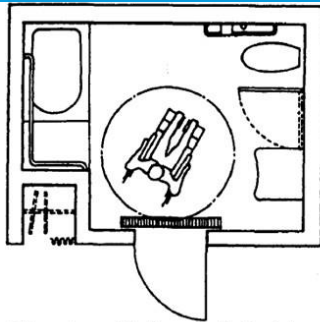
1. Immediately in front of a location where there is obstruction.
2. Immediately in front of an entrance/exit to and from a staircase or multilevel crossing facility.
3. Entrance/exit to institute
4. Sidewalk section of a guiding or approaching road to the building
5. Other places where installation of a guiding block for persons with impaired vision is considered effective (e.g. locations abruptly changing in level or ramp)



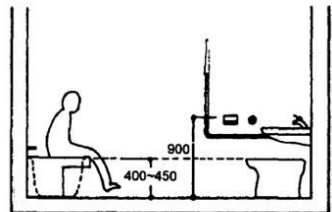
Information, signs at entrance



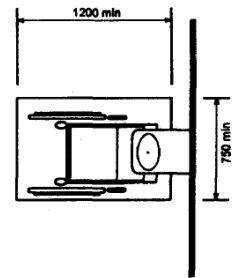
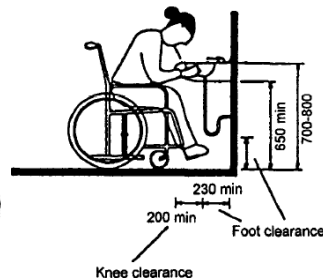
BATHROOM FOR HOSTEL FACILITY AT TRAINING CENTRE/ INDUSTRY



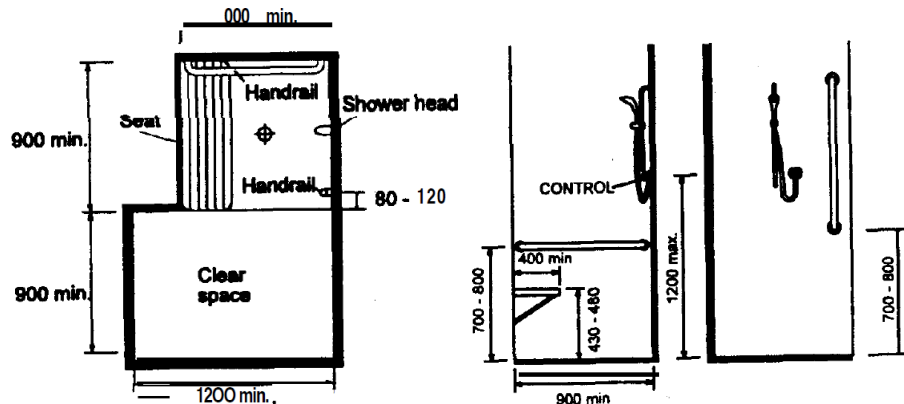
Plan view of bathroom (private)



Side elevation of bathroom (private)

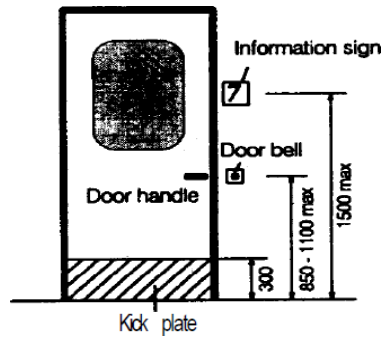


- The basin should be installed at a height and position for convenient access by wheelchair users.
- The basin should have appropriate knee clearance and foot clearance space for wheelchair users.
- Sufficient clear space for wheelchair users should be provided in front of the basin.
- The mirror should be so installed as to permit its use by wheelchair users.
- Shower cubicles should have seats whose width and height facilitate easy transfer by wheelchair users.
- Shower cubicles should have grab rails at a height and position that allows for easy gripping by wheelchair users.
- Shower cubicles should have call buttons or other signals devices at a height and position easily reached in an emergency.
- Sufficient space should be provided beside shower cubicles for transfer by wheelchair users.
- Shower doors, locks or catches should be of a type that can be opened from the outside in an emergency.
- Shower doors should preferably be of a sliding or outward opening type.
- These recommendations are relevant for communal bathing facilities for low-income households.

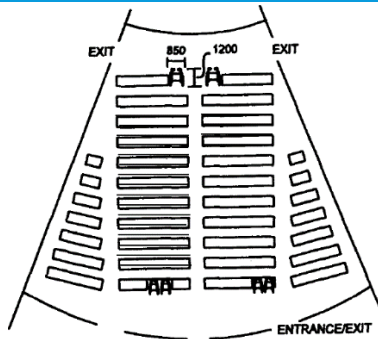


- WC or toilet compartments should have enough floor space for wheelchair users to enter and exit.
- The toilet bowl should be of a type (e.g. wall-hung) and in such a position as to permit easy approach by wheelchair users.
- The seat of the toilet bowl should be at the correct height for wheelchair users.
- WC compartments should have support rails at a position and height suitable for wheelchair users and other persons with physical disabilities. Upward-folding support bars are recommended to allow lateral transfer from a wheelchair.
- A toilet paper dispenser should be so installed as to be easily used by a person with physical impairments sitting on the toilet.
- Fittings, such as soap dispenser, electric hand dryer and mirror, should be low enough for a wheelchair user to use comfortably.
- The wash basin should be at a height that is easily accessible for wheelchair users.
- Lever-type taps should be installed to wash basins.
- Floor finishes should be of non-slip material.
- Doors should be either of the sliding or outward-opening type.

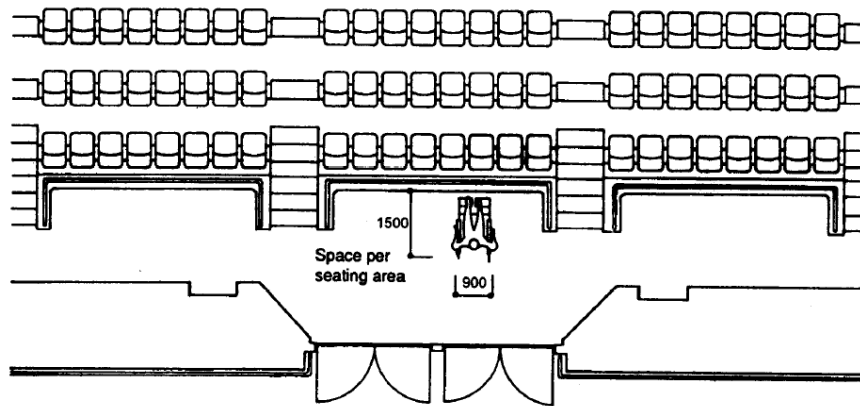
- Locks to toilet doors or cubicles should be of a type that can be opened from outside in case of emergency.



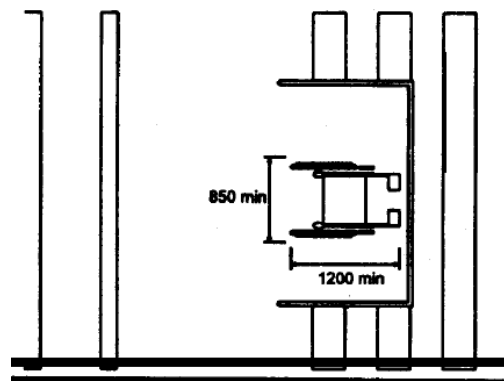
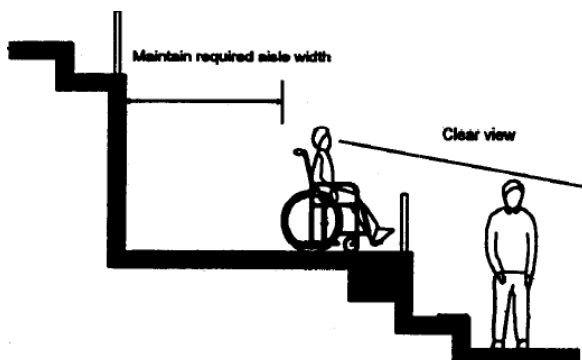
TRAINING/ CONFERENCE ROOM



- Applies to wheelchair spaces in auditoria, assembly halls, theatres and similar facilities.
- Accessible seating space should be provided in a variety of locations to give persons with physical disabilities a choice.



Plan view of guest seating arrangement



OTHER FACILITIES

Counters

To make a counter easily accessible for a wheel chair user, allow a space about 700mm high and 350mm deep under the counter.

Water Fountains (Drinking)

Allow sufficient space around the water fountain to make it easily accessible for wheel chair users. Depending on the type of water fountain allow a space about 700 mm high and 350 mm deep under the fountain.

Telephones

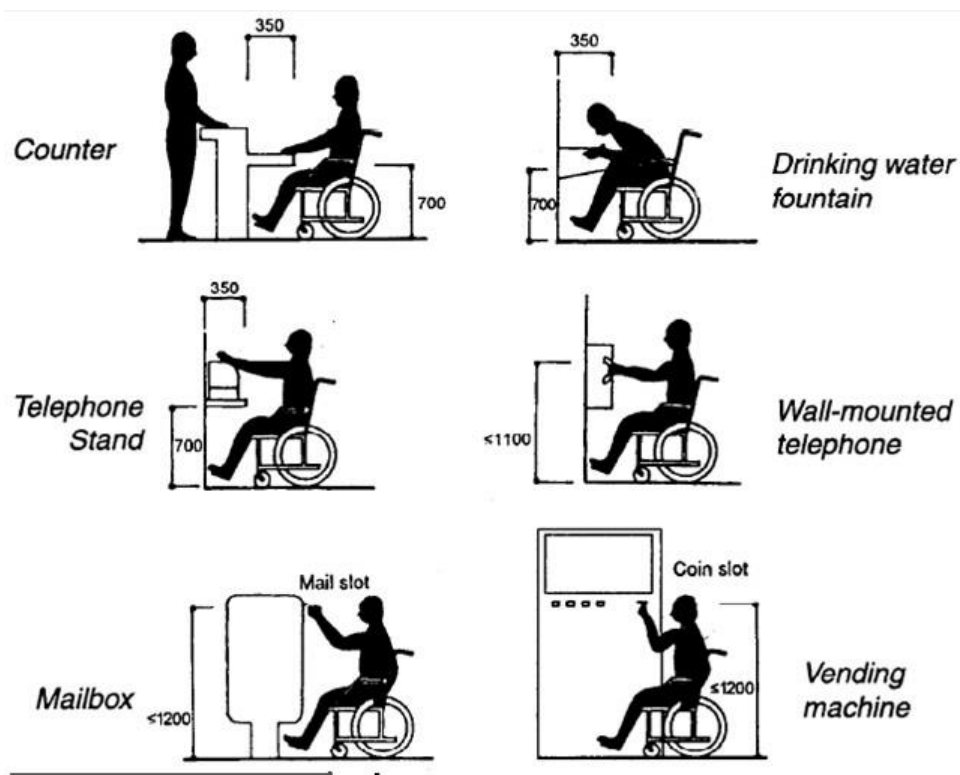
Allow a space about 700 mm high and 350 mm deep under the telephone stand. The telephone receiver must be placed at a height of 110 cm or less.

Mailboxes

The mail slot must be located at a height of 1200 mm or less.

Vending Machines

The coin slot must be located at a height of 1200 mm or less.



EXPLANATORY NOTES

GUIDING/WARNING FLOOR MATERIAL

The floor material to guide or to warn the visually impaired persons with a change of colour or material with conspicuously different texture and easily distinguishable from the rest of the surrounding floor materials is called **guiding or warning floor material**. The material with different texture gives audible signals with sensory warning when a person moves on this surface with walking stick. The guiding/warning floor material is meant to give the directional effect or warn a person at critical places. This floor material shall be provided in the following areas:

- a) The access path to the building and to the parking area.
- b) The landing lobby towards the information board, reception, lifts, stair-cases and toilets.
- c) Immediately at the beginning/end of walkway where there is obstruction
- d) At the location abruptly changing in level or beginning/ end of a ramp. Immediately in front of an entrance/exit and the landing.

PROPER SIGNAGE

Appropriate identification of specific facilities within a building for the PwD should be done with proper signages. Visually impaired persons make use of other senses such as hearing and touch to compensate for the lack of vision. Whereas visual signals benefit those with hearing disabilities

Signs should be designed and located so that they are easily legible by using suitable letter size (not less than 20 mm. high). For visually impaired persons, information board in braille should be installed on the wall at a suitable height and it should be possible to approach them closely. To ensure safe walking there should not be any protruding sign which creates obstruction in walking.

The symbols/ informations should be in contrasting colour and properly illuminated because people with limited vision may be able to differentiate amongst primary colours. International symbol mark for wheel chair as shown below be installed at the lift, toilet, staircase, parking areas etc., that have been provided for the PwD.

Reference taken from Guidelines and Space Standards for Barrier Free Built Environment for Disabled and Elderly Persons - Central Public Works Department, Ministry of Urban Affairs and Employment, India, 1998.