

Parking Facilities for Specially Able

Mahima Jain¹, Utkarsh Jain², Nandita Singh Ranawat³

^{1,3}Student, Department of Architecture, SDPS Women's College, Indore, India

²Assistant Professor, Department, SDPS Women's College, Indore, India

Abstract—There has always been a division between specially abled and normal people in public spaces (say parking), this paper highlights and promotes the ways to minus this division between the specially abled and normal people and propose various ways and means which can be used to diminish this barrier. Parking has been a serious issue due to rapid increase in vehicles and to cater this problem we require parking slots in important markets.

There are certain different norms which are used for design parking for especially abled and those norms can be redirected by the basic norms used for parking. Here in this paper author have tried to merge the norms for specially abled and normal design to neglect the differentiation between them, by performing case studies of various public spaces, reading various article and books on parking and disabilities. And concluding this study by redesigning parking space present in subhash chowk, Indore

Index Terms— Parking Facilities, Specially Able

I. INTRODUCTION

With the fast increasing population and increasing demand of social and economic growth, there has been a tremendous technical growth in all respect of present day life. The immobility of human is an insufficient approach to growth. To achieve a better life there is a necessity of exchange of information and idea from one place to another. To achieve a similar pace, all that gave birth to transportation since moving from one place to another in any form of medium mechanical movement or physical movement. To advance this process and maintenance a flow there is a mechanical and vehicular advancement.

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 everyday activities such as procurement of goods and services, community living, employment, and leisure. The fundamental principles which have been followed in developing standards / norms for various 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.

II. PARKING STUDIES

Vehicular transport needs a regular flow and maintained system called parking.

Parking is the act of stopping and disengaging a vehicle and leaving it unoccupied. Parking needs a proper design for regular and safe flow without causing any physical or mental harm to any human type with or without any health issue.

Parking should be designed according to the traffic volume in any type of building and its type should be chosen wisely with controlled technique of pollution and traffic control.

Perpendicular Parking: Perpendicular parking is a type of Parking that requires cars to be parked Side to side, perpendicular to an aisle or curb

Double Parking: Double parking means that someone has parked their car in a certain way that prevents another car from departing. Double parking can happen in different situation

Angular Parking: Where angle parking is required, vehicles shall stand at an angle of about forty-five degrees (45°) to the curb and with the right front wheel touching or within one foot of the curb and shall not be parked nearer to each other than one foot.

Stilt Parking: Stilt Car Parking space in a co-operative society is the space which is not open from top, meaning thereby that it is under the stilt or the Building constructed for the flats.

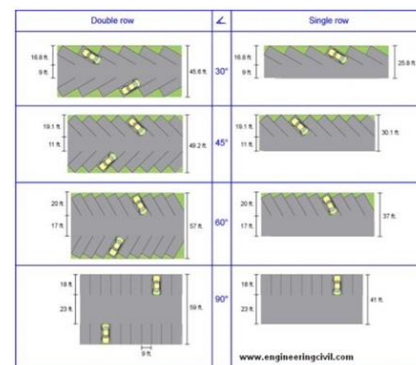


Fig. 1. Types of parking acc.to there arrangement

III. STUDY OF DISABILITY

A disability is an impairment that may be cognitive, developmental, intellectual, mental, physical, sensory, or some combination of these. It substantially affects a person's life activities and may be present from birth or occur during a

person's lifetime

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.



Fig. 2. Non-Ambulatory

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.

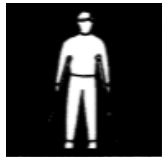


Fig. 3. Semi-Ambulatory

3. *Sight*: Total blindness or impairments affecting sight to the extent that the individual functioning in public areas is insecure or exposed to danger.



Fig. 4. Sight

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.



Fig. 5. Hearing

IV. OBJECTIVE

- Necessity of transport
- Study of traffic volume
- To calculate ECS
- Challenges to parking
- Find sustainable solution to challenge of parking through designing

- Psychological factor
- Treatment of smoke
- Eco centric designing
- Focusing particularly on the parking facilities for disable

V. SCOPE OF WORK

The scope of the research is to study the concept of vehicular parking in every kind of building (residence, commercial, public area etc.) for especially abled and to find the sustainable solution for parking.

VI. PROBLEM FORMULATION

It has been founded by studies that, there has been a severe issue in parking area with increasing population and vehicular necessity. It has not only affected a physical environment but also our built environment. The human disability are always been neglected in this scenario.

- The parking area that has been designed with no consideration of disable population.
- The design process has always focus upon the main function of the building and its purpose with no provision of proper and manage parking area as per the users need.
- The mechanization of vehicular advancement has resulted into greater carbon emission in the environment and causing harm to natural and
- Human health, therefore there is a need for better and sustainable parking.

VII. METHODOLOGY

Following methodology is being adopted in process of designing the parking for especially abled.

Calculation of number of parking space:

There are 3 methods to calculate no. of parking spaces:

- Cordon count method
- Patrolling method
- Questionnaire method

Cordon count method:

In this method the surveyor marks 2 end of road with a cordon line in the area where parking has to be designed and then the no. of vehicles is calculated in every interval of 15 min.

Patrolling method:

In this method surveyor calculate number of vehicles already parked in the surveying area.

Questionnaire method:

This is a long term process, in this method surveyor have to conduct many survey from different people present there and the survey involve

- Time interval of vehicle

TABLE I
 ANALYSIS FROM VARIOUS CASE STUDY

	Norms and anthropometry used for designing a parking		Case Study 1 (Indore)	Case Study 2 (Bhopal)
	in literature study	observed		
turning radius for ramp	5 m	3.5 m	x	✓
ratio of ramp	1:12	1:12 – 1:9	x	✓
size of ramp:	36 m	depend on ratio		
length	5.5 m for 2 way	5 m for 2 way		
width	3.0 m for 1 way	3 m for 1 way	✓	✓
floor to floor height	2.5 m	3-3.25 m	✓	✓
light and ventilation	12% of floor area	-	x	✓
staircase	in interval of 30 m	in interval of 20-30 m	x	✓
lifts size and numbers for cargo lift	1 or 2 acc to floor	1 or 2 acc to floor	x	✓
passenger lift	2 or 4 acc to floor	2 or 4 acc to floor		
area required by a vehicle	2.5 x 5 m ²	2 x 4 m ²	✓	✓
small car	0.6 x 2.5 m ²	0.5 x 1.5 m ²		
motor bikes				
basement provided	-	half basement	✓	x
marking of column and its size	should be designed by experts	in distance of 4m to 6m	✓	✓
plinth size and entrance	-	0.45 m – 0.6 m	✓	✓

- Trip purpose
- Regulatory visit

Basic norms for parking:

There is some minimum parking requirement for different types of building

- For residential plot less than 300 Sq. m only community parking space is required.
- For residential plot area from 500 to 1000Sq.m, minimum one fourth of the open area should be reserved for parking. Offices may require at least one space for every 70Sq.m parking area.
- One parking space is enough for 10 seats in a restaurant
- Whereas theatres and cinema halls need to keep only one parking space for 20 seats.

VIII. CONSIDERATION FOR PARKING IN CASE OF ESPECIALLY ABLED

A. Non-Ambulatory Disabilities

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

Wheelchair Users

A wheelchair may be operated by the user alone or with a helper’s assistance. However, wheelchair design must assume that the user should be able to operate the wheelchair without help. The width and length of the wheel chair, its control and the diameter of the casters decide the following:

- Width of entrances and exits: clear 900mm
- Width of the passage corridor min.: 900mm
- Slope of the climbing min. ramp slope 1:12

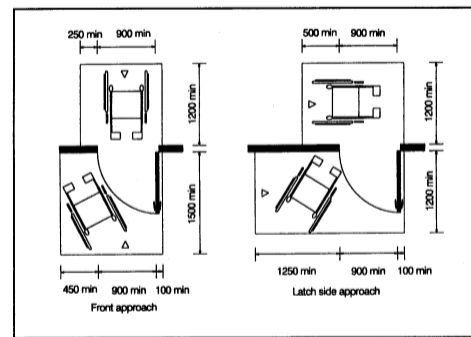


Fig. 6. Corridor length

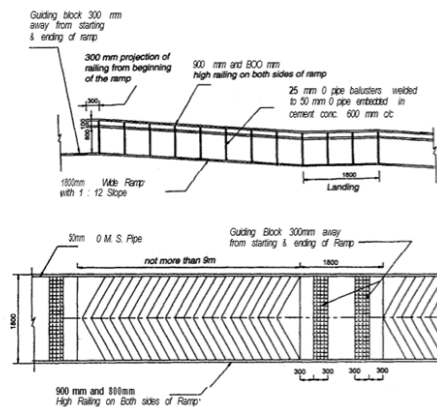


Fig. 7. Ramp detail

- Passing over different levels and grooves (Grating with narrow slots in the direction of movement and level difference to limit to 2cm or less)
- Lift size

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 persons capacity by Bureau of Indian Standards.

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

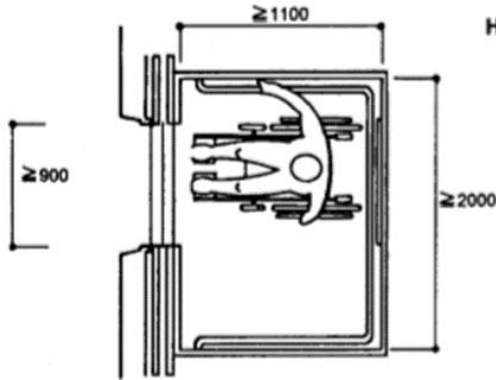


Fig. 8. Lift size

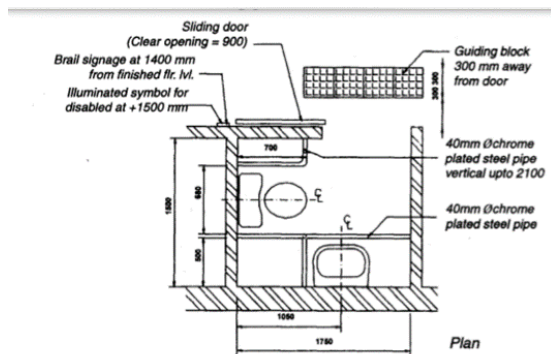


Fig. 9. Toilet size (Detail)

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).

C. Sight Disabilities

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 signage (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 signage, layout diagrams to help the persons easily reach the desired place.

IX. CONCLUSION

- After all the studies in parking and especially abled I conclude my paper by redesigning parking present in subhash chowk Indore.
- Number of vehicle are which is taken by the process mentioned above is 75 car parking and 200 two-wheeler parking.
- All the possible design consideration and taken for redesigning of parking.
- Also we can use the smoke which is coming out from the vehicle in a positive manner by separating all the gases from it and from that we can pick carbon and convert it to activated carbon and that carbon can be used for the filtration.
- From the basic physics of conversion we can also convert the energy involved in friction of car to road to the electrical energy and that electricity can be used to lit LED light fitted in the parking space.

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