

Report of the Sub-Committee constituted to prepare a set of guidelines for the scheme of Tagore Cultural Complexes.

Preamble

This is a historic moment, that after 60 years, a scheme of this magnitude has been introduced by the Ministry of Culture: its impact will be far reaching.

Through the scheme of Tagore Cultural Complexes, we are creating the infrastructure for nurturing our national performing talent. Our job is to ensure that this is done in the best possible way to serve the performing arts and theatre at its core. If this scheme works effectively, it will impact on the entire eco-system of performing arts in the country that will have long lasting effects on developing the value of theatre and performing arts, thereby contributing enormously to the cultural fabric of our country.

MOC has constituted a Sub-Committee of the following as its members to prepare a set of guidelines that the State Government and applicant organizations may keep in mind while preparing their detailed Project Reports for consideration under the scheme of Tagore Cultural complexes:-

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|------------------------|-----------------------------------|
| 1. Mr. K.T. Ravindran, | Professor, Urban Design, SPA |
| 2. Ms. Sanjana Kapoor, | Director, Prithvi Theatre, Mumbai |
| 3. Mr. Nissar Allana, | Theatre Expert, Delhi |
| 4. Mr. R.K. Safaya, | Executive Director, HUDCO |
| 5. Dr. Anuradha Kapur, | Director, NSD |

The above sub-committee met twice in the mid of September 2011. A report of the sub-committee is given as hereunder.

The sub-committee discussed various aspects relating to the above scheme and was of the view that it will be necessary to frame the guidelines by the applicant organizations.

As this is a very important project of the Government and will impact on future generations, all aspects in terms of design, architecture, management, administration etc. in establishing the Tagore Cultural Complexes will have to be discussed in detail to come to some concrete suggestions. Further, every member of the Committee may look at separate fields like environment / management / technical aspects of the respective areas where these complexes will have to be established by the State Governments so that after detailed studies, recommendations may be made accordingly. Meetings with such organizations / architects /designers may also be organized by the Government to get their views / suggestions in establishing these Complexes. As such, this committee needs to be an active part of this scheme so that comprehensive and concrete guidelines framed by them may be implemented.

After detailed discussions, the committee recommended that:-

1. It was felt that this committee's role needs to be formalized to be a constructive part in the Scheme.
2. It was also decided that committee members in person may visit all actual locations of the proposed complexes and give their suggestions in their respective fields.
3. All such theatre complexes may be connected through programme networking so that information relating to events organized by these complexes will be known to other complexes. This may help sustain the proper use of facilities created.
4. Interaction and meetings may be coordinated by the Ministry with the organizations / groups who wish to establish these Complexes in order the guidelines may be followed, and project may be discussed in detail.
5. Since the range of the project is so varied, it must be discussed on a case to case basis with the Committee.
6. It was recommended that MOC may authorize this sub-committee to monitor and supervise the work progress of the selected organizations in establishing Tagore Cultural Complexes. It was suggested that installments to all such selected organizations may also be released on receiving the recommendations of the sub-committee by MOC.
7. Every project proponent will have to establish its own management, technical and administrative teams for functioning of their respective complexes. However, necessary training programmes in management / technical areas for such personnel will be organized once in a year in consultation with this sub-committee, for developing skills in their respective fields. Further, every complex will host such training programmes, from time to time.
8. It was recommended by the committee that all guidelines may be prepared in such a way so that the applicant organizations may understand them easily.
9. The sub-committee will address applications for restructuring of old Tagore theatre separately from new projects.

Brief Write-up

I attended a meeting on 28th September in NSD and agreed with most of the points raised by the Sub-committee. However I would put across following suggestions also.

1. Regarding the issue of green building norms, Government of India has already issued energy conservation building code which is published by Bureau of Energy Efficiency and is a comprehensive guideline document on green buildings. This is applicable to new buildings as well as gives out fairly detailed requirements for the alterations of the existing buildings. It is available on the website that www.eco3.org.
2. Govt. of India has already issued a circular notice that all Government buildings shall have to obtain GRIHA-3 rating (Green Rating for integrated habitat assessment). Each building is required to be registered with the GRIHA Secretariat, which involves payment of some fees etc. GRIHA integrates all relevant Indian Code and Standards for buildings and Acts as a tool to facilitate design and implementation of green buildings. This document is published by Ministry of New and Renewable Energy, Govt. of India and The Energy Resource Institute (TERI), New Delhi. All the 5 volumes are available with the TERI, which are extremely helpful for the designers. The relevant website is www.teriin.org.
3. It would be therefore, appropriate to include above information in the proposed guidelines and leave it to the State Government/architect to workout appropriate design solutions based on above. There is absolutely no need for giving any further instructions regarding architectural design etc.
4. The existing Tagore Theatres in most of the cities are land mark buildings both from the function point of view as well as from the urban design considerations. As far as I am aware some of the buildings are also the representations of the first modern architectural movement in the country. The Tagore Theatre at Chandigarh was designed by Mr. Aditya Prakash who previously worked with Le Corbusier. The Tagore Theatre at Ahmedabad was either designed by Le Corbusier himself or Shri Shiv Nath Prasad a very eminent Architect. There another category which was designed and constructed by CPWD, some of them is in good shape and represent reasonably local

level architectural character. Some of the Tagore Theatres have very less supporting land available and some have large. Any additional construction on the existing Tagore Theatre plots may not be desirable from the aesthetic point of view as well as functional point of view. The additional construction will also increase traffic load and will also displace some little green bio-mass available in the city. It is therefore, suggested that the existing Tagore Theatre may be upgraded from the point of view of following:-

- a) Retaining the existing capacity but improving the facilities/services which will include lighting, audio, as well as other visual requirements.
- b) Improving the façade if it is not acceptable. Of course this may involve only cosmetics.
- c) Improve the landscape and avoid any further constructions. This landscape garden if more land is available could be converted into a memorial garden, with open air theatre and a food court.

The objective of above would be only to upgrade the existing Tagore Theatre and create an important cultural destination in the city. So far as the technology up-gradation is concerned we may not able to bring it upto the International level because of structural restrictions. However, the upgradation can happen within a limited budget upto a certain acceptable level. There is no need to increase the capacity beyond what is available.

So far as the requirements of performing arts ie green room details the inputs could be provided by the other members of the committee.

5. So far as the premises are concerned, there is absolutely wide scope. However, a cultural complex/theatre with the capacity of 1000 to 2000 may not be economically viable for most of the cities and would definitely involve private participation in a very big way for operation and maintenance.

Further I would like to repeat that so far green building norms are concerned the energy conservation building code and the GRIHA National Rating system explains all such green norms in detail. No additional work is required to be done on this subject

Mr. R K Safaya

HUDCO

**Green Rating for Integrated Habitat
Assessment (GRIHA)**

**National Rating System
for
Green Buildings**

**Ministry of New & Renewable Energy
Government of India**



GRIHA – green building ‘design evaluation system’– A tool to design, operate, evaluate and maintain resource efficient ‘healthy’ and ‘intelligent’ building

What is a green building?

Buildings have major environmental impacts over their entire life cycle. Resources such as ground cover, forests, water, and energy are depleted to give way to buildings.

A green building depletes the natural resources to the minimum during its construction and operation. The aim of a green building design is to minimize the demand on non-renewable resources, maximize the utilization efficiency of these resources, when in use, and maximize the reuse, recycling, and utilization of renewable resources. It maximizes the use of efficient building materials and construction practices; optimizes the use of on-site sources and sinks by bio-climatic architectural practices; uses minimum energy to power itself; uses efficient equipment to meet its lighting, air-conditioning, and other needs; maximizes the use of renewable sources of energy; uses efficient waste and water management practices; and provides comfortable and hygienic indoor working conditions. In sum, the following aspects of the building design are looked into in an integrated way in a green building.

- Site planning
- Building envelope design
- Building system design ((HVAC) heating ventilation and air conditioning, lighting, electrical, and water heating)
- Integration of renewable energy sources to generate energy onsite.
- Water and waste management
- Selection of ecologically sustainable materials (with high recycled content, rapidly renewable resources with low emission potential, etc.).
- Indoor environmental quality (maintain indoor thermal and visual comfort, and air quality)

1.0 GRIHA- the green building rating system

1.0.1 The context

Internationally, voluntary building rating systems have been instrumental in raising awareness and popularizing green design. However, most of the internationally devised rating systems have been tailored to suit the building industry of the country where they were developed. In India a US based LEED rating system is under promotion by CII Green Business Centre, Hyderabad which is more on energy efficiency measures in AC buildings. Keeping in view of the Indian agro-climatic conditions and in particular the preponderance of non-AC buildings, a National Rating System - GRIHA has been developed which is suitable for all kinds of

building in different climatic zones of the country. The system was initially conceived and developed by TERI (The Energy & Resource Institute) as TERI-GRIHA which has been modified to GRIHA as National Rating System after incorporating various modifications suggested by a group of architects and experts. It takes into account the provisions of the National Building Code 2005, the Energy Conservation Building Code 2007 announced by BEE and other IS codes, local bye-laws, other local standards and laws. The system, by its qualitative and quantitative assessment criteria, would be able to 'rate' a building on the degree of its 'greenness'. The rating would be applied to new and existing building stock of varied functions – commercial, institutional, and residential.

1.0.2 The benefits

GRIHA- the National Rating System will evaluate the environmental performance of a building holistically over its entire life cycle, thereby providing a definitive standard for what constitutes a 'green building'. The rating system, based on accepted energy and environmental principles, will seek to strike a balance between the established practices and emerging concepts, both national and international. The guidelines/criteria appraisal may be revised every three years to take into account the latest scientific developments during this period.

On a broader scale, this system, along with the activities and processes that lead up to it, will benefit the community at large with the improvement in the environment by reducing GHG (greenhouse gas) emissions, improving energy security, and reducing the stress on natural resources.

Some of the benefits of a green design to a building owner, user, and the society as a whole are as follows :

- Reduced energy consumption without sacrificing the comfort levels
- Reduced destruction of natural areas, habitats, and biodiversity, and reduced soil loss from erosion, etc.
- Reduced air and water pollution (with direct health benefits)
- Reduced water consumption
- Limited waste generation due to recycling and reuse
- Reduced pollution loads
- Increased user productivity
- Enhanced image and marketability

1.0.3 The basic features

Currently the system has been developed to help 'design and evaluate' new buildings (buildings that are still at the inception stages). A building is assessed based on its predicted performance over its entire life cycle – inception through operation. The stages of the life cycle that have been identified for evaluation are the pre-construction, building design and construction, and building operation and maintenance stages. The issues that get addressed in these stages are as follows:

- Pre-construction stage (intra- and inter-site issues)
- Building planning and construction stages (issues of resource conservation and reduction in resource demand, resource utilization efficiency, resource recovery and reuse, and provisions for occupant health and well being). The prime

resources that are considered in this section are land, water, energy, air, and green cover.

- Building operation and maintenance stage (issues of operation and maintenance of building systems and processes, monitoring and recording of consumption, and occupant health and well being, and also issues that affect the global and local environment).

1.1 Synopsis of the criteria for rating

The criteria have been categorised as follows:

1.1.1 Site planning

Conservation and efficient utilization of resources

Objective: To maximize the conservation and utilisation of resources (land, water, natural habitat, avi fauna, and energy) conservation and enhance efficiency of the systems and operations.

Criteria 1 Site Selection:

Commitment: Site plan should be in conformity to the Development Plan/Master Plan/UDPFI guidelines (mandatory). Site should be located within ½ km radius of an existing or planned and funded bus stops, commuter rail, light rail or metro station or the proposed site is a brownfield site (to rehabilitate damaged sites where development is complicated by environmental contamination, reducing pressure on undeveloped land).

Criteria 2 Preserve and protect the landscape during construction/compensatory depository forestation.

Commitment Proper timing of construction, preserve top soil and existing vegetation, staging and spill prevention, and erosion and sedimentation control. Replant, on-site, trees in the ratio 1:3 to those removed during construction.

Criteria 3 Soil conservation (till post-construction).

Commitment Proper top soil laying and stabilization of the soil and maintenance of adequate fertility of the soil to support vegetative growth.

Criteria 4 Design to include existing site features.

Commitment Minimize the disruption of natural ecosystem and design to harness maximum benefits of the prevailing micro-climate.

Criteria 5 Reduce hard paving on-site and /or provide shaded hard- paved surfaces.

Commitment Minimize storm water run-off from site by reducing hard paving on site.

Criteria 6 Enhance outdoor lighting system efficiency.

Commitment Meet minimum allowable luminous efficacy (as per lamp type) and make progressive use of a renewable energy -based lighting system.

Criteria 7 Plan utilities efficiently and optimize on-site circulation efficiency.

Commitment Minimize road and pedestrian walkway length by appropriate planning and provide aggregate corridors for utility lines.

Health and well being

Objectives To protect the health of construction workers and prevent pollution.

Criterion 8 Provide at least, the minimum level of sanitation/safety facilities for construction workers.

Commitment Ensure cleanliness of workplace with regard to the disposal of waste and effluent, provide clean drinking water and latrines and urinals as per applicable standard.

Criterion 9 Reduce air pollution during construction.

Commitment Ensure proper screening, covering stockpiles, covering brick and loads of dusty materials, wheel-washing facility, water spraying.

1.1.2 Building planning and construction stage

Conservation and efficient utilization of resources

Objective To maximize resource (water, energy, and materials) conservation and enhance efficiency of the system and operations.

Water

Criterion 10 Reduce landscape water requirement.

Commitment Landscape using native species and reduce lawn areas while enhancing the irrigation efficiency, reduction in water requirement for landscaping purposes.

Criterion 11 Reduce building water use.

Commitment Reduce building water use by applying low-flow fixtures, etc.

Criterion 12 Efficient water use during construction.

Commitment Use materials such as pre-mixed concrete for preventing loss during mixing. Use recycled treated water and control the waste of curing water.

Energy: end use

Criterion 13 Optimise building design to reduce the conventional energy demand.

Commitment Plan appropriately to reflect climate responsiveness, adopt an adequate comfort range, less air-conditioned areas, daylighting, avoid over-design of the lighting and air-conditioning systems.

Criterion 14 Optimise the energy performance of the building within specified comfort limits.

Commitment Ensure that energy consumption in building under a specified category is 10%–40% less than that benchmarked through a simulation exercise. Ensure that thermal comfort in non air conditioned spaces are within specified limits.

Energy: embodied and construction

Criterion 15 Utilization of fly ash in the building structure.

Commitment Use of fly ash for RCC (reinforced cement concrete) structures with in-fill walls and load bearing structures, mortar, and binders.

Criterion 16 Reduce volume, weight, and time of construction by adopting an efficient technology (e.g. pre-cast systems, ready-mix concrete, etc.).

Commitment Replace a part of the energy-intensive materials with less energy-intensive materials and/or utilize regionally available materials, which use low-energy/energy-efficient technologies.

Criterion 17 Use low-energy material in the interiors.

Commitment Minimum 70% in each of the three categories of interiors (internal partitions, panelling/false ceiling/interior wood finishes/ in-built furniture door/window frames, flooring) from low-energy materials/finishes to minimize the usage of wood.

Energy: renewable

Criterion 18 Renewable energy utilization.

Commitment Mandatory provide renewable energy system with capacity equivalent to 1% of connected load for lighting and space conditioning. Meet energy requirements for a minimum of 5% of the internal lighting load (for general lighting) or its equivalent from renewable energy sources (solar, wind, biomass, fuel cells, etc). Energy requirements will be calculated based on realistic assumptions which will be subject to verification during appraisal.

Criterion 19 Renewable energy - based hot- water system.

Commitment Meet 20% or more of the annual energy required for heating water through renewable energy based water-heating systems.

Recycle, recharge, and reuse of water

Objective: To promote the recycle and reuse of water.

Criterion 20 Waste- water treatment

Commitment Provide necessary treatment of water for achieving the desired concentration of effluents.

Criterion 21 Water recycle and reuse (including rainwater).

Commitment Provide wastewater treatment on-site for achieving prescribed concentration, rainwater harvesting, reuse of treated waste water and rainwater for meeting the building's water and irrigation demand.

Waste management

Criterion 22

Commitment: To minimize waste generation, streamline waste segregation, storage, and disposal, and promote resource recovery from waste.

Criterion 23 Reduction in waste during construction.

Commitment Ensure maximum resource recovery and safe disposal of wastes generated during construction and reduce the burden on landfill.

Criterion 24 Efficient waste segregation.

Commitment Use different coloured bins for collecting different categories of waste from the building.

Criterion 25 Storage and disposal of waste.

Commitment Allocate separate space for the collected waste before transferring it to the recycling/disposal stations.

Criterion 26 Resource recovery from waste.

Commitment Employ resource recovery systems for biodegradable waste as per the *Solid Waste Management and handling Rules, 2000 of the MoEF*. Make arrangements for recycling of waste through local dealers.

Health and well-being

Objective To ensure healthy indoor air quality, water quality, and noise levels, and reduce the global warming potential.

Use of low-VOC (volatile organic compounds) paints/ adhesives / sealants.

Commitment Use only low VOC paints in the interior of the building. Use water – based rather than solvent based sealants and adhesives.

Criterion 27 Minimize ozone depleting substances.

Commitment Employ 100% zero ODP (ozone depletion potential) insulation; HCFC (hydrochlorofluorocarbon)/ and CFC (chlorofluorocarbon) free HVAC and refrigeration equipments and/halon-free fire suppression and fire extinguishing systems.

Criterion 28 Ensure water quality.

Commitment Ensure groundwater and municipal water meet the water quality norms as prescribed in the Indian Standards for various applications (*Indian Standards for drinking [IS 10500-1991], irrigation applications [IS 11624-1986]*). In case the water quality cannot be ensured, provide necessary treatment of raw water for achieving the desired concentration for various applications.

Criterion 29 Acceptable outdoor and indoor noise levels.

Commitment Ensure outdoor noise level conforms to the Central Pollution Control Board–Environmental Standards–Noise (ambient standards) and indoor noise level conforms to the *National Building Code of India, 2005, Bureau of Indian Standards, Part 8–Building Services; Section 4–Acoustics, sound insulation, and noise control*.

Criterion 30 Tobacco and smoke control.

Zero exposure to tobacco smoke for non-smokers, and exclusive ventilation for smoking rooms.

Criterion 31 Universal accessibility

Commitment: To ensure accessibility and usability of the building and its facilities by employees, visitors and clients with disabilities

1.1.3 Building operation and maintenance

Objective Validate and maintain ‘green’ performance levels/adopt and propagate green practices and concepts.

Criterion 32 Energy audit and validation.

Commitment Energy audit report to be prepared by approved auditors of the Bureau of Energy Efficiency, Government of India.

Criterion 33 Operation and maintenance protocol for electrical and mechanical equipment.

Commitment Ensure the inclusion of a specific clause in the contract document for the commissioning of all electrical and mechanical systems to be maintained by the owner, supplier, or operator. Provide a core facility/service management group, if applicable, which will be responsible for the operation and maintenance of the building and the electrical and mechanical systems after the commissioning. Owner/builder/ occupants/ service or facility management group to prepare a fully documented operations and maintenance manual, CD, multimedia or an information brochure listing the best practices/do's and don'ts/maintenance requirements for the building and the electrical and mechanical systems along with the names and addresses of the manufacturers/suppliers of the respective system.

1.1.4 Innovation

Criterion 34 Innovation points.

Four innovation points are available under the rating system for adopting criteria which enhance the green intent of a project, and the applicant can apply for the bonus points. Some of the probable points, not restricted to the ones enumerated below, could be

1. Alternative transportation
2. Environmental education
3. Company policy on green supply chain
4. Life cycle cost analysis
5. Any other criteria proposed by applicant

1.2 Scoring points for GRIHA

GRIHA is a guiding and performance-oriented system where points are earned for meeting the design and performance intent of the criteria. Each criterion has a number of points assigned to it. It means that a project intending to meet the criterion would qualify for the points. Compliances, as specified in the relevant criterion, have to be submitted in the prescribed format. The points related to these criteria (specified under the relevant sections) are awarded provisionally while certifying and are converted to firm points through monitoring, validation, and documents/photographs to support the award of point. GRIHA has a 100 point system consisting of some core points, which are mandatory to be met while the rest are optional points, which can be earned by complying with the commitment of the criterion for which the point is allocated. The innovation points are available over and above the 100 point system. This means that a project can hypothetically apply for a maximum of 104 points. But the final scoring shall be done out of 100 points. Different levels of certification (one star to five star) are awarded based on the number of points earned. The minimum points required for certification is 50. Buildings scoring 50 to 60 points, 61 to 70 points, 71 to 80 points, and 81 to 90 points shall get one star, 'two stars', 'three stars' and 'four stars' respectively. A building scoring 91 to 100 points will get the maximum rating viz. five stars.

Points scored	Rating
50–60	One star
61–70	Two stars
71–80	Three stars
81–90	Four stars
91–100	Five stars

The details of the points are given below:

1.3 Evaluation procedure of criterion of GRIHA

List of criteria and points for GRIHA		
Criteria		Points
Criteria 1	Site Selection	1 Partly mandatory
Criteria 2	Preserve and protect landscape during construction /compensatory depository forestation.	5 Partly mandatory
Criteria 3	Soil conservation (post construction)	4
Criteria 4	Design to include existing site features	2 Mandatory
Criteria 5	Reduce hard paving on site	2 Partly mandatory
Criteria 6	Enhance outdoor lighting system efficiency and use RE system for meeting outdoor lighting requirement	3
Criteria 7	Plan utilities efficiently and optimise on site circulation efficiency	3
Criteria 8	Provide ,at least, minimum level of sanitation/safety facilities for construction workers	2 Mandatory
Criteria 9	Reduce air pollution during construction	2 Mandatory
Criteria 10	Reduce landscape water requirement	3
Criteria 11	Reduce building water use	2
Criteria 12	Efficient water use during construction	1
Criteria 13	Optimise building design to reduce conventional energy demand	6 Mandatory
Criteria 14	Optimise energy performance of building within specified comfort	12
Criteria 15	Utilisation of fly ash in building structure	6
Criteria 16	Reduce volume, weight and time of construction by adopting efficient technology (e.g. pre-cast systems, ready-mix concrete, etc.)	4
Criteria 17	Use low-energy material in interiors	4
Criteria 18	Renewable energy utilization	5 Partly Mandatory
Criteria 19	Renewable energy based hot water system	3
Criteria 20	Waste water treatment	2
Criteria 21	Water re-cycle and re-use (including rainwater)	5
Criteria 22	Reduction in waste during construction	2
Criteria 23	Efficient waste segregation	2

Criteria 24	Storage and disposal of waste	2	
Criteria 25	Resource recovery from waste	2	
Criteria 26	Use of low VOC paints/ adhesives/ sealants.	4	
Criteria 27	Minimize Ozone depleting substances	3	Mandatory
Criteria 28	Ensure water quality	2	Mandatory
Criteria 29	Acceptable outdoor and indoor noise levels	2	
Criteria 30	Tobacco and smoke control	1	
Criteria 31	Universal Accessibility	1	
Criteria 32	Energy audit and validation		Mandatory
Criteria 33	Operations and Maintenance protocol for electrical and mechanical equipment	2	Mandatory
Total score		100	
Criteria 34	Innovation(beyond 100)	4	
		104	

2.0 Operationalisation of GRIHA –the NRS

2.1 National Advisory Council (NAC)

A National Advisory Council (NAC) has been constituted by the MNRE and shall be convened by the Advisor, MNRE. The NAC shall comprise eminent architects, senior government officials from the Central Ministry, Bureau of Energy Efficiency, Central Public Works Department and select state nodal agencies; representatives from the IT sector, real estate sector and developers; and representatives from the GRIHA secretariat, TERI. The NAC shall be chaired by the Secretary, MNRE and co-chaired by the Director General, TERI.

The NAC shall provide advice and direction to the National Rating System and shall be the interface between MNRE and the rating secretariat, which will be located within TERI. Its broad functions will be as below:

- i) Guide the administrative structure for GRIHA
- ii) Decide fee structure
- iii) Endorse the rating
- iv) Recommend incentives, awards etc. by GOI /State Governments
- v) Endorse modifications / upgrades from time to time.

2.1.1 Technical Advisory Committee (TAC)

A Technical Advisory Committee has been be constituted by the MNRE for providing technical advice to the GRIHA team on modifications and up gradation of the GRIHA framework to a National Rating System. The technical advisory team shall comprise eminent architects and experts well versed with design and construction of green buildings . Three meetings of TAC have been held .

2.1.2 The Ministry proposes to incentivise the National Rating System with a view to promote large scale design and construction of green buildings in the country.

Guidelines and Space Standards for Barrier Free Built Environment for Disabled and Elderly Persons

Preamble

The main objectives of the "Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995 enacted by the Government of India on January 1, 1996 are to create barrier free environment for persons with disabilities and to make special provisions for the integration of persons with disabilities into the social mainstream.

Chapter VII of the Act, Sections 44 to 46 deal with non-discrimination in transport on the roads and in the built environment. It enjoins upon the governments and local authorities to ensure within their economic capacity provision for installation of auditory signals at red lights in the public roads for the benefit of persons with visual handicaps, kerbs and slopes to be made in pavements for the easy access of wheel chair users, devising appropriate symbols of disability and warning signals at appropriate places.

In regard to non-discrimination in the built environment, provisions have been made in this Act for ramps in public buildings, adaptation of toilets for wheel chair users, Braille symbols and auditory signals in elevators.

In order to create a barrier free environment in consonance with the provisions of the Act, the Government of India (Ministry of Urban Affairs & Employment) is currently engaged in the process of amending/modifying the existing building bye-laws which would be applicable to all buildings and facilities used by the public.

With this intention to ensure that everyone, including the physically disabled and elderly persons will have equal access in every day life in the city, the Min. of UA&E has constituted a committee under the chairmanship of DG(W), CPWD with the following members for the purpose of developing comprehensive Guidelines and space standards for barrier free built environment for disabled and elderly persons.

1. Director General (Works), CPWD	Chairman
2. Chief Architect I, CPWD	Member Convener
3. Chief Planner, TCPO	Member
4. Chief Architect, DDA	Member
5. Chief Architect, MCD	Member
6. Chief Engineer, MCD	Member

The access standards codes have taken into consideration the access needs of diverse disability groups, such as persons with mobility, speech, hearing, and visual impairments by meeting disabled peoples standards for safety, convenience and usability.

This "Guidelines and space standards for Barrier Free Built Environment for Disabled and Elderly Person" have also considered the comments received from School of Planning and Architecture (SPA) CBRI, Handicapped Welfare Federation (NGO) and National Federation of Blind (NGO).

The scopes and responsibilities which have been identified in various organizations will include the followings:

Academic Institution

- There should be a conscious attempt of all educationalists to develop young architects/planners with an awareness of creating barrier free environment for physically handicapped.
- A detail design exercise should be carried out in all schools of Architecture in their curriculums as an essential subject of architecture education.

State Govt./Central Govt. Agencies

- The Govt. departments should follow the recommended standards of provisions for disabled alongwith the general guidelines.

Municipal Bodies/Corporations

- The building codes should specify basic architectural provisions that need to be incorporated in new buildings to make them convenient for disabled.
- An integrated effort should also require from all local authorities to update their building codes.
- Municipal authorities/corporations should ensure, before giving permissions of construction, the provisions of stepless system for easy access to buildings, lifts for free access to upper floors, adequate doors width for wheel chairs entry and accessible toilets.

Main Topics

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[Type of Disabilities](#)

[Mobility Devices](#)

[Controls](#)

[Construction and Maintenance Standards](#)

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[Design Elements within the Building Premises](#)

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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. 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 buildings, health care institutions, meet disabled peoples standards for safety, convenience and usability. Barrier free design standards should satisfy anyone who is hampered in his mobility of functioning (as compared with a non disabled 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 report 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 public for making accessible to and functional for physically disabled person. Although the recommendations are concerned exclusively with the requirements of disabled people but the facilities will invariably make buildings more convenient for elderly persons and persons suffering from any kind of physical ailments. A safer, easier environment for the physically disabled benefits everyone.

The main purpose is to integrate disabled and elderly persons fully into the society. The presumption that all elderly are handicapped, or that all handicapped of the needs of both groups and is a disservice to both.

Building types to which the recommendations may be applied for are services, community living, employment, residential buildings other than domestic buildings, commercial buildings, Industrial buildings, health care institutions, educational establishments, community and religious centres agricultural and transport facilities. The guide lines have also indicated the minimum access provisions required in various types of buildings.

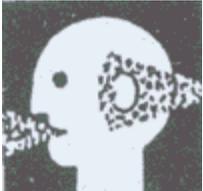
Builders, designers and architects are ultimately the users of this standard to ensure the specific environment created by them

are suitable for all categories of people. The standard also indicated that barrier free design can be achieved without economic burden to the client, builder, designer, and the architect. It will help to provide framework for developing policies to ensue a barrier free environment and eliminate the lack of awareness in both the public and private sectors to the problem of accessibility. This standard shall be a valuable document to exchange comments between disabled consumers architects and others interested in an environment which does not exclude disabled people. This may also generate research activities to provide required knowledge base.

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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 and those with pulmonary and 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	

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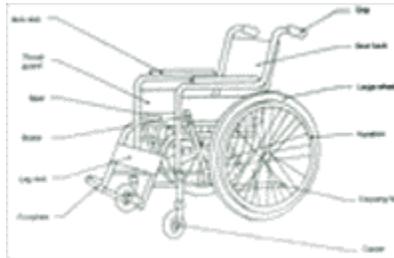
Mobility Devices

Recommendation

Adequate space for persons using mobility devices

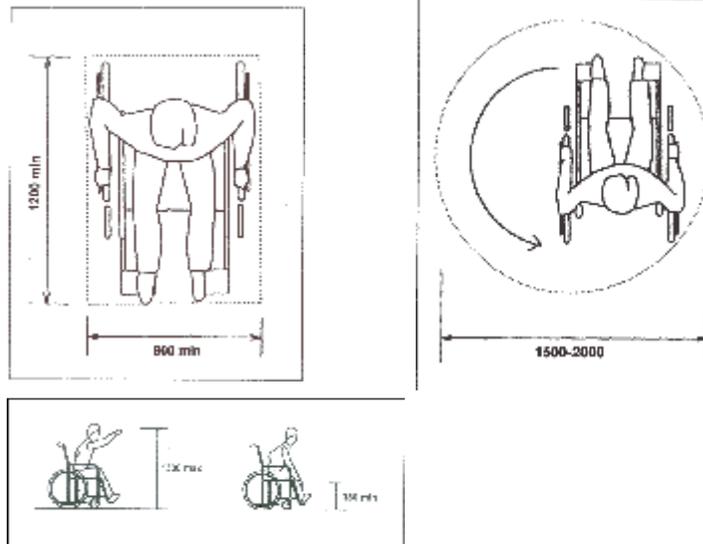
- Adequate space should be allocated for persons using mobility devices, e.g. wheelchairs, crutches and walkers, as well as walking with the assistance of other persons (Fig. 1, 2 and 7).
- The range of reach (forward and side; with or without obstruction) of a persons in a wheelchair should be taken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

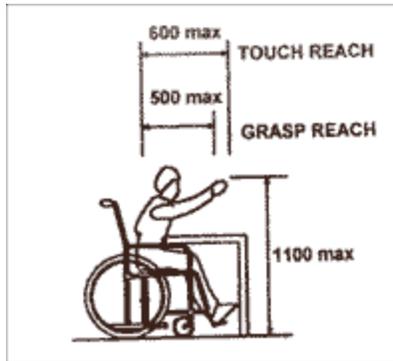
Wheel Chair



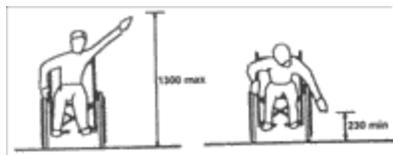
Structure of wheelchair and name of each part(standard type)

Forward reach without obstruction

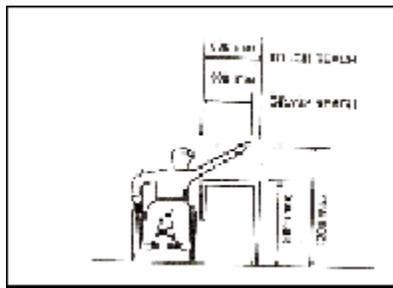




Forward reach over obstruction

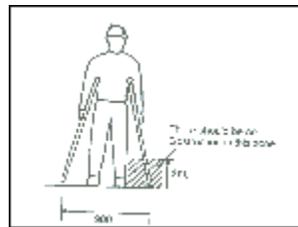


Side reach without obstruction



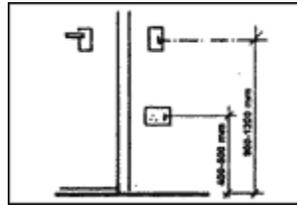
Side reach over obstruction

Crutches



Space Allowance

Controls



Heights for Switches, Doors, Handrails

Controls

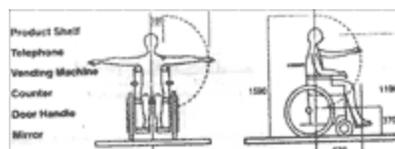
- For locking and opening controls for window and doors should not be more than 1400mm from the finished floor usable by one hand.
- Switches for electric light and power as well as door handles and other fixtures and fittings should be between 900mm - 1200mm from finished floor.
- Power point for general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



Typical Dimensions for Essential uses with in easy reach

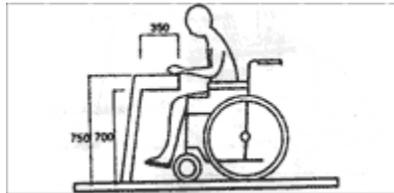
Range of Reach

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



Range of Reach

- A wheelchair has a footplate and leg rest attached in front of the seat. (The footplate extends about 350mm in front of the knee). The footplate may prevent a wheelchair user from getting close enough to an object.
 - a. Manually operated equipment must be designed to be easily accessible from a wheelchair.
 - b. Make sure that the coin slots of vending machines etc. are located no higher than 1200mm.
 - c. Allow a space at least 350mm deep and 700mm high under a counter, stand, etc.



Space required for wheelchair footplate

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Construction and Maintenance Standards

Special Needs for the Persons with disabilities:-

With regards to the design guidelines the special needs of the persons with disabilities for construction of built environment are as follows:

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 exists (clear 900mm, [click here to view image](#))
- Width of the passage/corridor (min. 900mm, [click here to view image](#))
- Slope of the climbing (min. ramp slope 1:12, [click here to view image](#))
- Passing over different levels and grooves (Grafting with narrow slots in the direction of movement and level difference to limit to 2 cm or less, [click here to view image](#)).
- Range of reach ([click here to view image](#))

- Transferring from wheel chair (adequate space is required to transfer from wheel chair to toilet seat and bed. (Ref. Details of toilets, and guest rooms, Page No. 43 & 65).
- Lift size (Ref. Details of lift, click here to view image).
- Toilet size (Ref. Details of toilet, click here to view image)

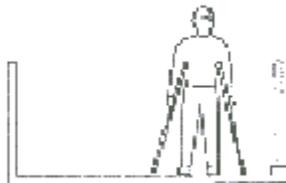
B. Semi Ambulatory Disabilities

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 can not 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 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 facilities and outside the building. (Refer details of guiding/warning blocks).
- 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

Person 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.

Elderly person

Elderly persons may suffer impaired mobility, sight disabilities or any other physical difficulties, for which the design guidelines for them within and outside the buildings and facilities shall be similar like other physically disabled persons.

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Classification of Buildings

Category 1	Residential
Category 2	Commercial
Category 3	Manufacturing
Category 4	Public and Semipublic
Category 5	Recreational
Category 6	Transportation & Communication
Category 7	Agriculture & Water Bodies
Category 8	Special Area

Category 1	Residential Primary Residential Zone Mixed Residential Zone Unplanned Informal Residential Zone
Category 2	Commercial Retail Shopping Zone General Business & Commercial District Centres Wholesale, Godowns, Warehousing/Regulated Markets.
Category 3	Manufacturing Service and Light Industry Extensive and Heavy Industry Special Industrial Zone, Hazardous, Noxious, and chemical

Category 4	Public and Semi-public Govt/Semi Govt/Public Offices Education and Research, Medical and Health Social Cultural and Religious Utilities and Services
Category 5	Recreational Playgrounds/stadium/sports complex Parks & Gardens-Public open spaces Special recreational zone-restricted openspaces Multi open-space (Maidan)
Category 6	Transportation & Communication Roads Railways Airports Seaports and Dockyards Bus Depots/Trucks Terminals & Freight complex Transportation and Communication
Category 7	Agriculture & Water Bodies Agriculture Forest Poultry and Daily Farming Rural Settlements Brick Kiln and Extractive Areas Water Bodies
Category 8	Special Area Old Built up (core) Area Heritage and Conservation Area Scenic Value Areas Village Settlement Other uses

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Min. Access Provisions Required in Various Types of Buildings

<u>Type of Building</u>	<u>Minimum Provisions</u>
<ul style="list-style-type: none"> • Single detached, single dwelling units 	<p>A minimum of 2 per cent of the total number of units to be constructed with barrier-free features. (Adoptable Units)</p>
<ul style="list-style-type: none"> • Staff housing, multiple dwelling and high rise residential units and tenements 	<p>A minimum of 1 unit for every 25, plus 1 additional unit for every 100 units thereafter. Entrances and exits to be accessible.</p>
<ul style="list-style-type: none"> • Tenement houses, row houses, apartments and town houses. 	<p>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.</p>
<ul style="list-style-type: none"> • Post offices, banks and financial service institutions 	<p>A minimum of 1 lowered service counter on the premises</p> <p>A minimum of 1 lowered automatic teller machine (ATM) cash disbursement point on the premises. Stamp vending machine.</p>
<ul style="list-style-type: none"> • Shophouses and single-storey shops 	<p>Accessible shopping area</p>
<ul style="list-style-type: none"> • Places of worship 	<p>Entrances and exits and main area of worship to be accessible.</p> <p>Mosques: access to area for ablutions; Churches: access to-confessionals, fonts and chapels;</p> <p>Temples: access to shrines arid courtyards.</p>
<ul style="list-style-type: none"> • Food centres 	<p>A minimum of 1 table without stools or seats attached to the floor for</p>

	<p>every 10 tables.</p> <p>A minimum of 2 tables without stools or seats attached to the floor for the whole premises.</p> <p>Accessible entrance</p>
<ul style="list-style-type: none"> Community centres, village halls, auditoria, concert halls, assembly halls, cinemas, theatres and other places of public assembly. 	<p>Accessible entrances, exists, aisles and main community or public gathering areas.</p> <p>Accessible toilet facilities should be nearby.</p> <p>Seating for persons with disabilities to be accessible from main entrances and lobbies.</p> <p>Various seating/viewing choice to be provided for persons in wheelchairs throughout the main setaing area.</p> <p>A minimum of 2 wheelchair spaces for seating capacity up to 100 seats.</p> <p>A minimum of 4 wheelchair spaces for seating capacity from over 100 to 400 seats.</p>

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Design Elements within the Building Premises

(Public Buildings)

1. Site Planning

- Walks and Paths
- Levels and Grooves
- Kerb Ramp

2. Parking

3. Approach to Plinth Level

- Ramped Approach
- Stepped Approach

4. Entrance landing
5. Corridor
6. Entrance Landing
7. Windows
8. Stair Ways
9. Lift
10. Toilet
11. Signages
12. Other Facilities

- Counter
- Water Fountain
- Telephone
- Mailbox
- Vending Machine

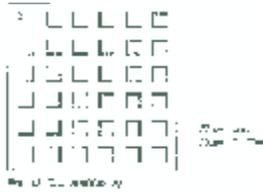
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Site Planning

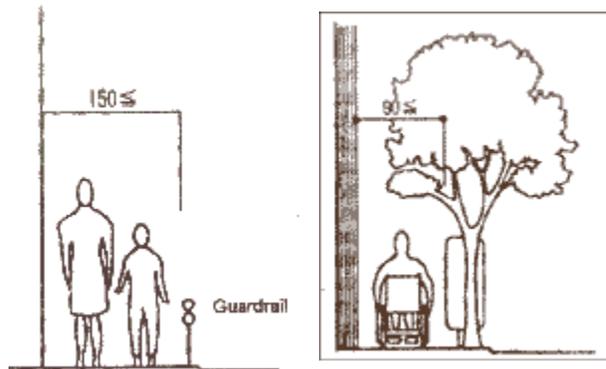
To accommodate the handicapped and elderly people each building and its site should be planned and designed as an integral unit from the very beginning of the design process.

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 walkway 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 walkways 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.



Details of Grating



Levels and Grooves

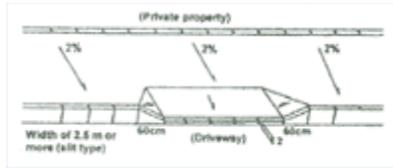
(Passing over different levels and grooves)

- 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.

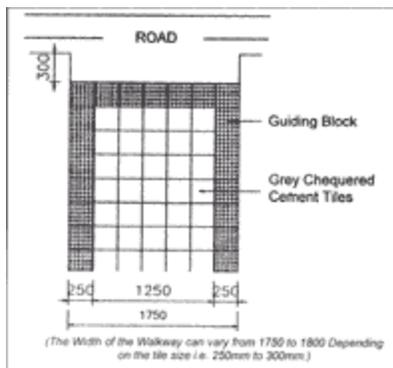


- It can be difficult to move a wheelchair if a caster is caught in a groove.
 - a. It is desirable that there is no difference in level, (if a difference is unavoidable, limit it to 20 mm or less.)
 - b. Round off or bevel the edge.
 - c. To prevent a wheelchair from getting its casters caught in a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

Kerb Ramp

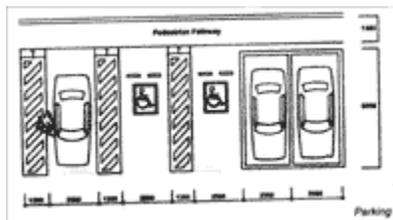


Typical Detail of Walkway



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.

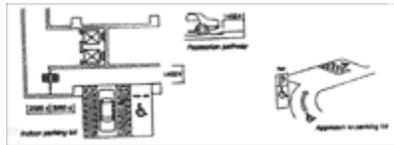


Parking

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

- a. Surface parking for two care spaces shall be provided near entrance for the physically handicapped persons with maximum travel distance of 30 M from building entrance.
- b. The width of parking bay shall be minimum 360 Meter.

- c. The information stating that the space is reserved for wheel chair users shall be conspicuously displayed.
- d. 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.

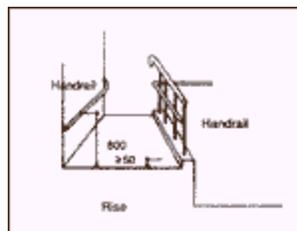
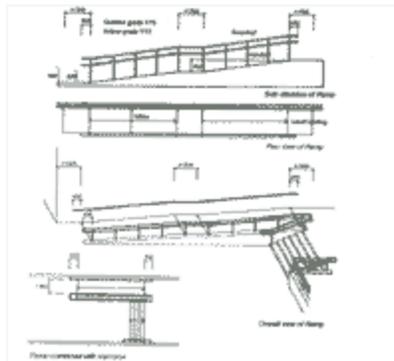


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Approach to the Plinth Level

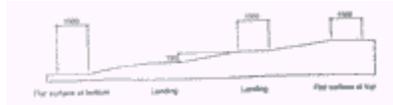
Approach to plinth level: Every building should have at least one entrance accessible to the handicapped and shall be indicated by proper signage. This entrance shall be approached through a ramp together with the stepped entry.

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.



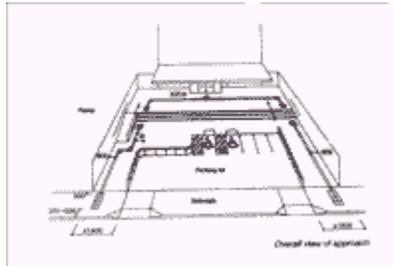
Cross Section of Ramp

- 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.

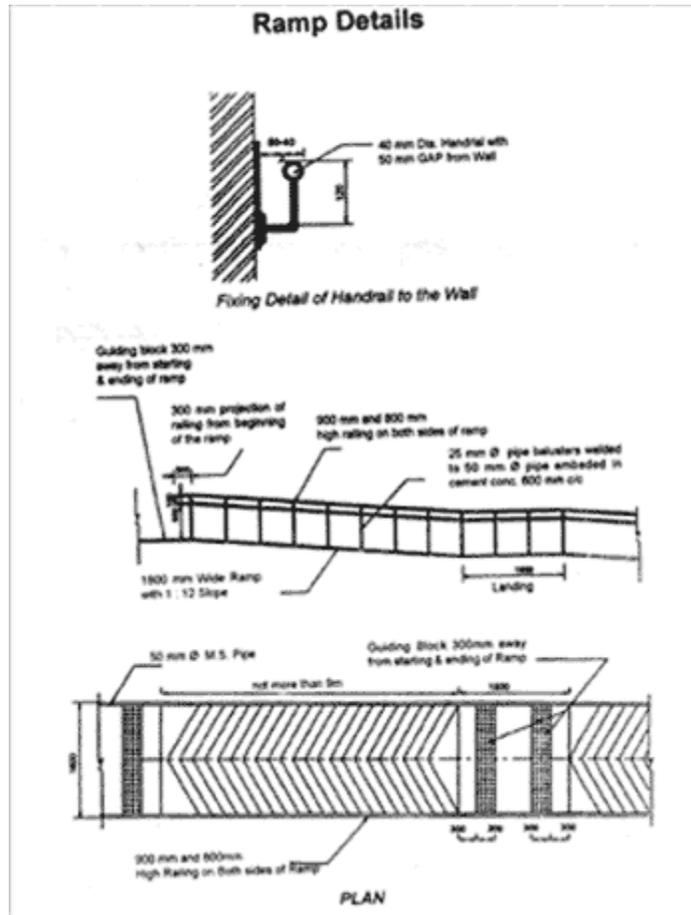


Cross Section of ramp

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.

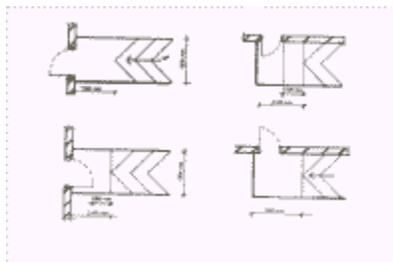


Ramp Details



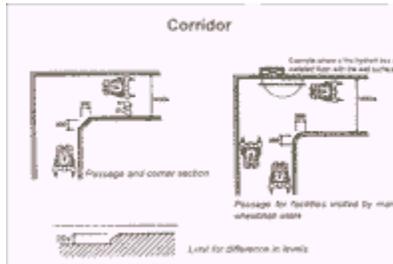
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Entrance Landing



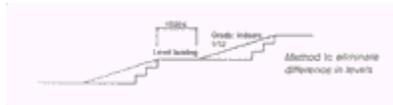
Entrance Landing:- Entrance landing shall be provided adjacent to ramp with the minimum dimension 1800 x 2000 mm. The entrance landing that adjoin the top end of a slope shall be provided with floor materials to attract the attention of visually impaired persons (limited to coloured floor material whose 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" (Annexure -1). 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 handicapped:- The corridor connecting the entrance/exit for handicapped leading directly outdoors to a place where information concern in the overall use of the specific 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 15000 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.

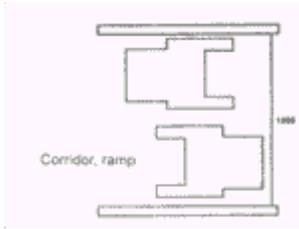


1. Required width for passage of wheelchair

- 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.
- 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

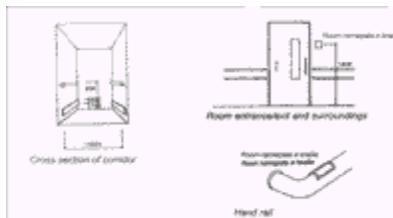
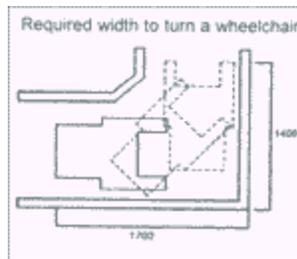




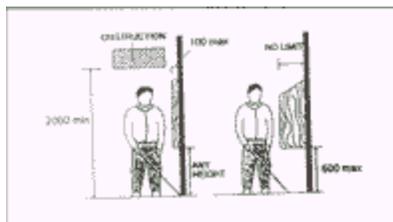
a. Corridors etc. must at least be 900 mm wide. At this width, however, it is difficult to turn a wheelchair

2. Required width to turn a wheelchair

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

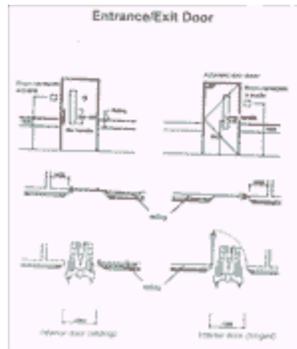


Protruding objects, such as directional signs, tree branches, wires, guy ropes, public telephone booths, benches and ornamental fixtures should be installed with consideration of the range of a visually impaired person's cane



Protruding objects

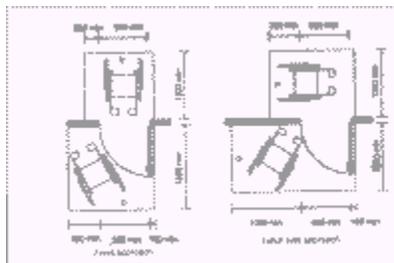
Entrance/Exit Door



Exit/Entrance Door:- Minimum clear opening of the entrance door shall be 900 mm. And it shall not be provided with a step that obstruct the passage of a wheel chair user. Threshold shall not be raised more than 12 mm.



Sliding door

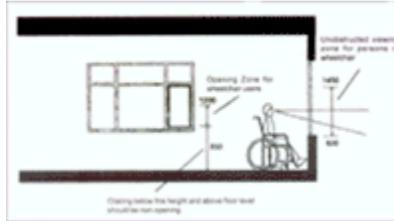


Doorways

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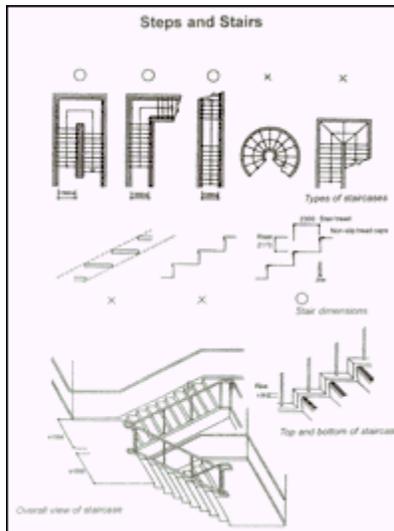
Windows

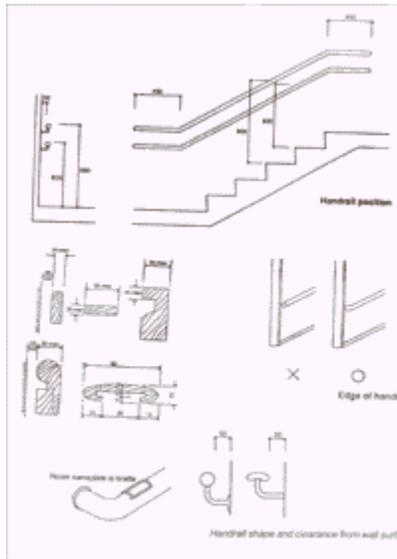
- A window should have handies/controls at a height that permits use from wheelchairs.
- A window should have an unobstructed viewing zone for wheelchair users.
- Curtain or venetian blind controls/ropes should be accessible for wheelchair users.



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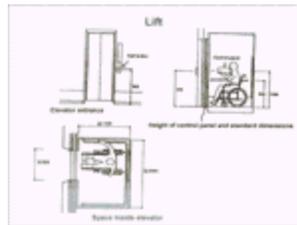
Steps and Stairs





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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 persons capacity by Bureau of Indian Standards.

Clear internal depth : 1100 mm.

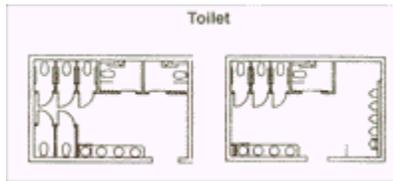
Clear internal width : 2000 mm.

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 audible of the cage for entrance/exit is either open or closed.

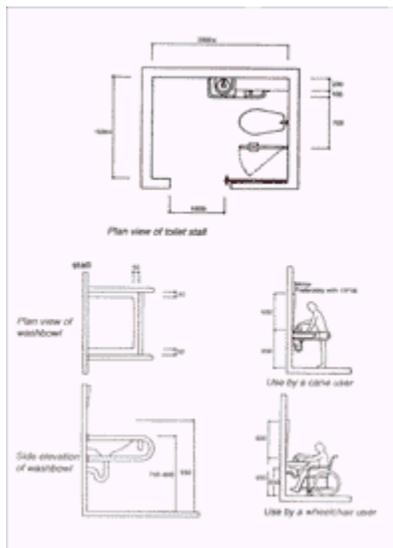
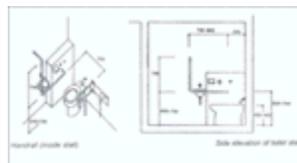
[Top](#)

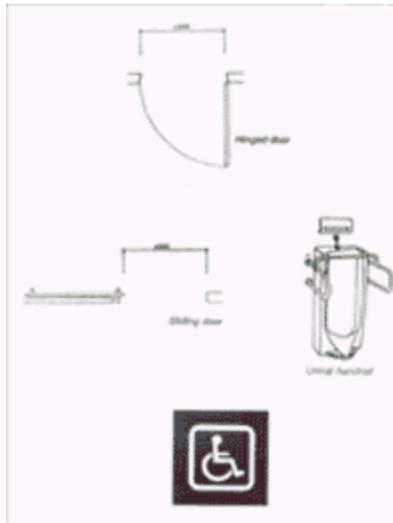
Toilet



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

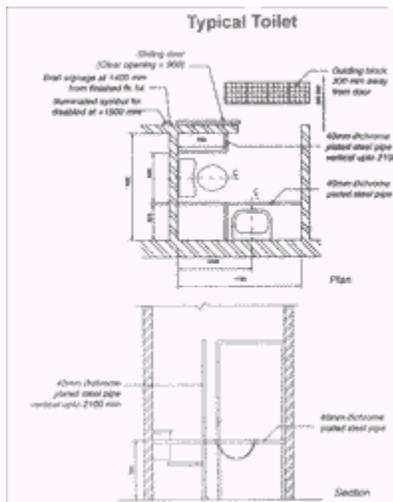
- The minimum size shall be 1500 x 1750
- Minimum clear opening of the door shall be 900 mm. and the door shall swing out.
- Suitable arrangement of vertical/horizontal handrails with 50 mm. clearance from wall shall be made in the toilet.
- The W.C. seat shall be 500 mm. from the floor.





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Typical Toilet



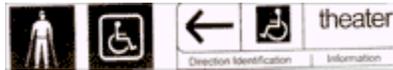
- Toilet floor shall have a non-slip surface without any lvl. Difference.
- Guiding block near the entry should have a textural difference, (e.g. Diamon Tiles, Prima Regina Tiles, Undressed Granite)
- Light-weight PVC door shutter should be provided as a sliding door
- Provision of vertical and horizontal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

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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.

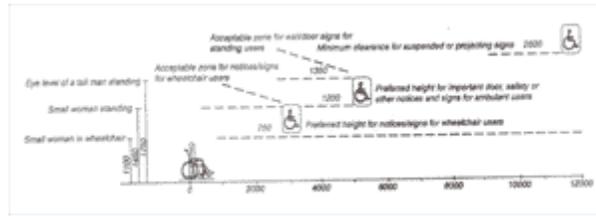


'Height' of letter for varying viewing distance

Required viewing Distance (M)	Minimum height of letter (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

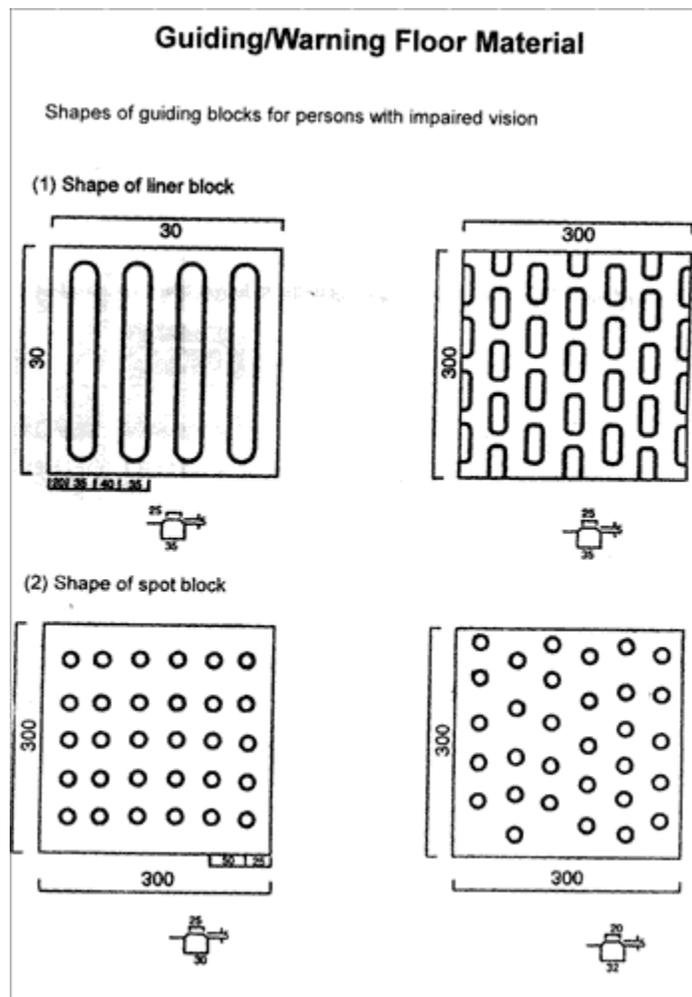
Requiring viewing Distance (M)	Minimum size of letter (MM)
0.7	60x60
7.18	10x110
18+	Min. 200x200
	Max.450x450



- 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.

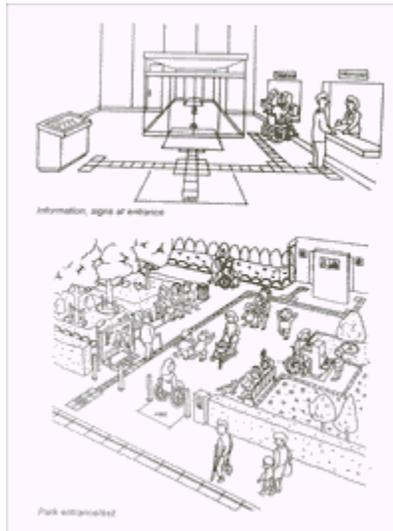
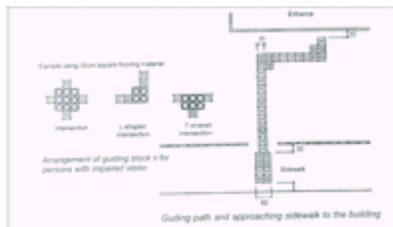
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Guiding/Warning Floor Material



Places to install guiding blocks for persons with impaired vision

1. Immediately in front of a location where there is a vehicular traffic.
2. Immediately in front of an entrance/exit to and from a staircase or multilevel crossing facility.
3. Entrance/exit to and from public transportation terminals, or at boarding areas.
4. Sidewalk section of a guiding or approaching road to the building.
5. Path from a public facility which is frequently visited by persons with impaired vision (e.g. a city hall or library) to the nearest railroad station (to be installed at intervals)
6. Other placed where installation of a guiding block for persons with impaired vision is considered effective (eg. locations abruptly changing in-level or ramp).



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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 700mm high and 350mm deep under the fountain.

Telephones

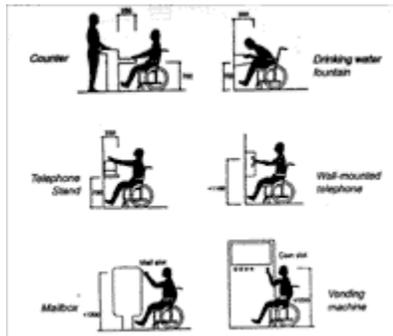
Allow a space about 700mm high and 350mm deep under the telephone stand. The telephone receiver must be placed at a height of 110 cm or less.

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.



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Design Elements Outside the Building

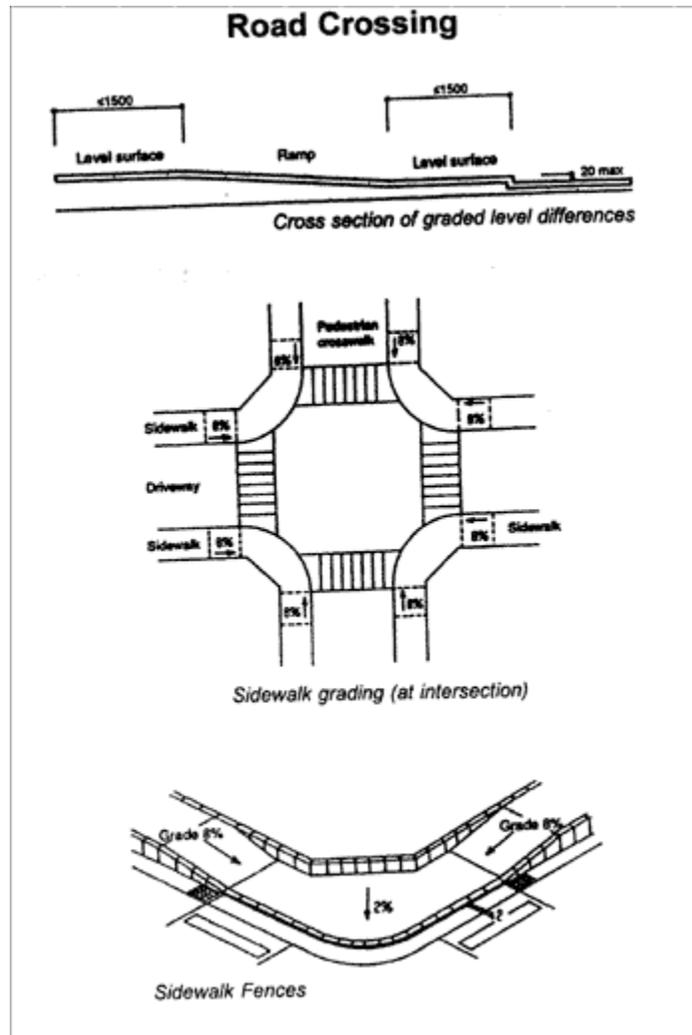
1. Kerb at Footpath
2. Road Crossing
3. Public Toilets
4. Bus Stops/Taxi Stand
5. Telephone Booth
6. Signages

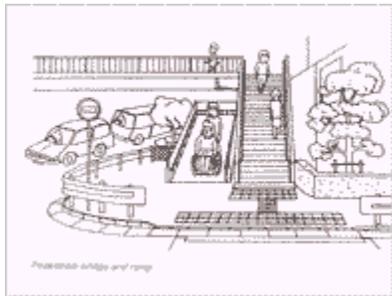
Note:

Kerb At Foot Path	<ul style="list-style-type: none"> For details, refer Site Planning
Signages	<ul style="list-style-type: none"> For details, refer Signages in Design Elements Within The Building Premises.

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Road Crossing





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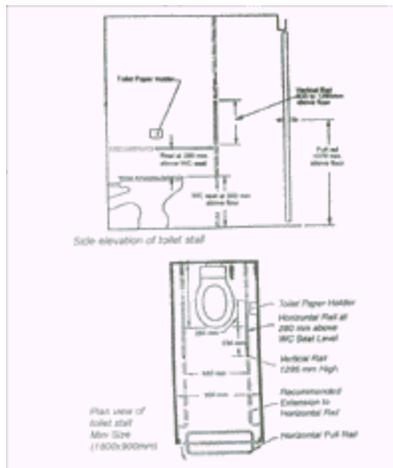
Public Toilets

The toilet bowl should preferably be a stool type.

At least one of the toilet bowls must have a handrail installed.

The door should, as a rule, be outward-opening.

The door lock must be easily operable. Also, an indication must be provided on the outside of the stall to show that the toilet is occupied.



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Bus Stops

- Two rows of guiding blocks for persons with impaired vision should be provided 300 mm, away from the bus stop pole on the sidewalk.
- The bus stop pole should be clearly visible after dark.

- The bus stop area should be equipped with a roof and bench.



- Information on the names of all stops along a bus route should be indicated inside the bus by displaying text in a suitable position. Preferably, this information should also be announced verbally.
- Information on a route and its final destination should be displayed outside the bus in large text, especially on its front and side. This information should be illuminated by an internal light to make it readable in the dark.

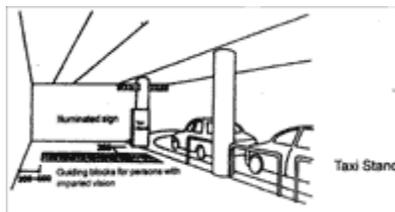


Guiding blocks for persons with impaired vision

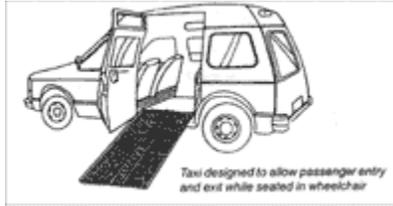
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Taxi Stand

- Two rows of guiding blocks for person with impaired vision should be provided 300mm. away from the taxi stand pole on the sidewalk.
- The taxi stand pole should be visible after dark.
- For wheelchair users to be able to approach a taxi easily, sudden level difference from the taxi stand to the road need to be eliminated.



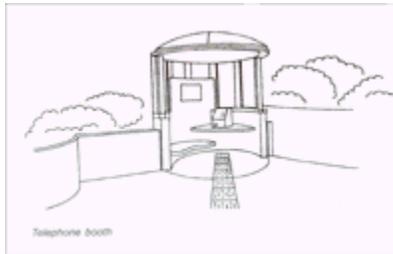
- It is recommended that taxis be adapted to allow passengers to get in and out of them while remaining seated in their wheelchairs.



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Telephone Booth

- Sufficient floor or ground space for a forward or parallel approach by a wheelchair user should be provided near telephone booths.
- The highest part of a telephone should be within reach of a seated person.
- Knee space should be provided under telephones.



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Residential Buildings

Essential areas for barrier free design standards for disabled other than the general building design standards are as follows:

Street

Shopping area

Access to transportation

Kitchen

Bathroom

Bedrooms

Living rooms

Windows and the view

Street

Before building any apartment house for the elderly and handicapped, it is advisable to note street conditions, access to transportation, proximity to shopping areas, and whether there are major obstacles between the apartment house and the shopping locations.

Both wheelchair users and elderly handicapped persons have a common need of hard, nonslip, even street surface. Avoid loose gravel and provide continuing common surface not interrupted by steps or sudden changes in level, and other obstructions such as manhole covers, light or telephone poles. The street should be marked with signages in braille and visual signages at appropriate height to indicate the shopping area, apartment blocks, bus stop, taxi stand.

Shopping Area

It is not enough to design a barrier free building for the handicapped and elderly, one must also provide barrier free streets and shopping areas within the immediate vicinity if the residents are to as self sufficient as they would like an could be.

There should not be any major crossing between the apartment block and shopping area. If unavoidable, some form of safe crossing, such as bridge r subway accessible by ramp and steps over or below the highway should be planned which people could get from one side of the road to the other. The shops should be accessible with all essential barrier free design elements such as ramped approach along with stepped approach, adequate space for landing, sufficiently wide corridor, signages, sliding or automatic door, guiding warning block, accessible counter, telephone booth, mail box, and toilet facilities.

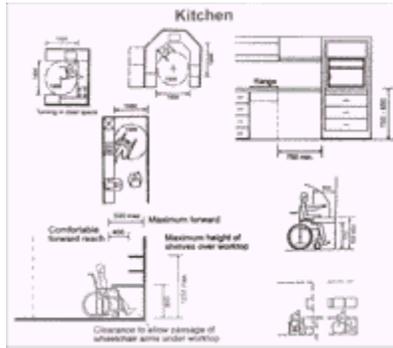
Access to transportation

It is essential to accept that very few handicapped or elderly persons living in such a special housing are able to drive or have their own cars, because of their handicaps or age, or even for economic reasons. This means that both, groups which are required to take care for easy access to transportation facilities are as below.

- Safe crossing facilities for persons with wheel chair and with impaired vision by providing acoustic signal and installing a safety zone on a wide road.
- Provision of kerb ramp at appropriate location at the footpath.
- Provision of guiding block at the starting and ending of crossing.
- Accessible bus stop/taxi stand (refer transportation, details or bus stop/taxi stand).
- Accessible sub way/over bridge (refer transportation, details of over bridge).
- Accessible concourse, ticket booth of the railway station (refer transportation).

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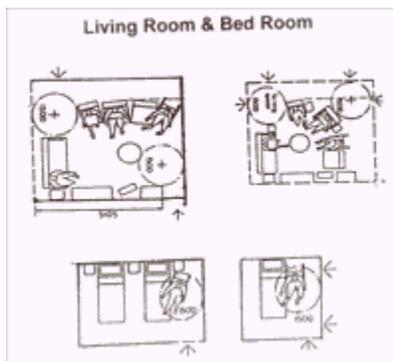
Kitchen



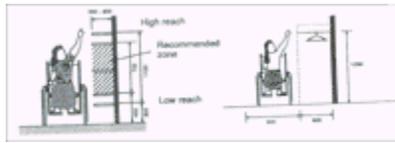
- Floor space should allow easy wheelchair movement between, worktop, sink and cooking stove. A 1500 mm min. width should be provided for wheelchair turns between counter and opposite wall.
- Worktops, sinks, and cooking area should be at the same level at a height of 780 mm - 800 mm high from floor.
- A knee room of 700 mm high should be provided under the sink.
- Base cabinets storage space with hinged doors and fixed or adjustable shelves should be avoided . Base cabinets are most usable with drawers of various depth. Pullout vertical units at one or both sides of the work centres are desirable.
- Maximum height of shelves over worktop is 1200 mm.
- A min. gap of 400 mm. should be provided between the edge of work top and top shelves. Side reach for low shelf height should be 300 mm.

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Livingroom and Bedroom



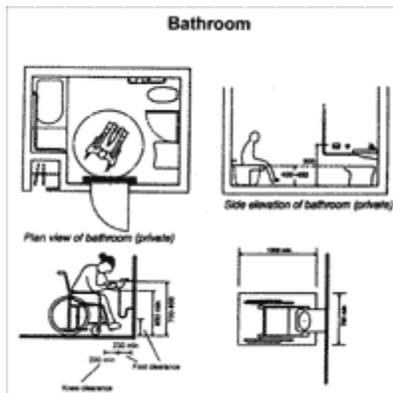
- At least 1500 mm turning in space for wheel chair should be kept near all entry points to the living area.
- A living dining combination is preferable to a kitchen dining combination.
- A wheelchair requires at least 750 mm seating space at the dining table.



- Sleeping - living room combinations are not recommended. Bed rooms for the wheelchair users need more floor area to provide wheelchair circulation.
- The bedroom layout should be such that the bed should not be in a corner of a wall. At least 900 mm should be provided for a wheelchair from the side of the wall for access and there should be large enough-space for transfer by a wheelchair user, or for a helper to assist in the transfer.
- The bed should be at a height from the ground that permits wheel chair turning under the bed.
- A min. 900 m width should be kept in front of bedroom closet and any other furniture.
- Clothes hanger rod should be at a height between 1050 mm - 1200 mm. The max. and min. height of shelf should be 1400 and 300 mm, and the recommended zone is from 450 mm to 1200 mm.

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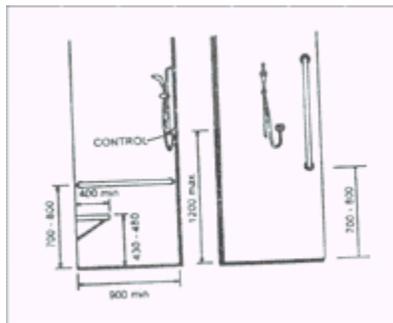
Bathroom



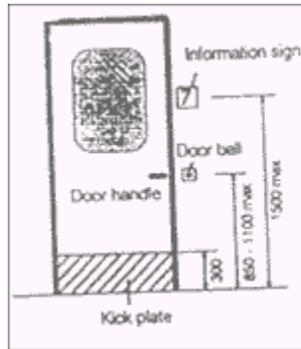
- The basin should be installed at a height and position for convenient access by wheelchair users.
- The basin should have appropriate knee clearance and foot clearance space for wheelchair users.
- Sufficient clear space for wheelchair users should be provided in front of the basin.
- The mirror should 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 sliding or outward opening type.
- These recommendations are relevant for communal bathing facilities for low-income households.

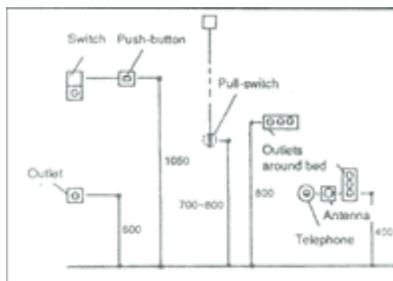
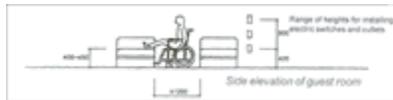
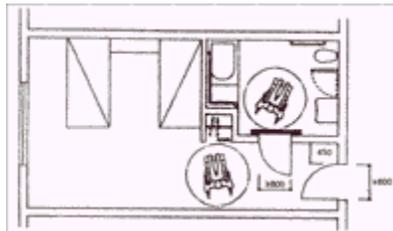


- WC or toilet compartment should have enough floor space for wheelchair users to enter and exit.
- The toilet bowl should be of a type (e.g. wall-hung) and in such a position as to permit easy approach by wheelchair users.
- The seat of the toilet bowl should be at the correct height for wheelchair 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.
- Level-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.



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Guest House

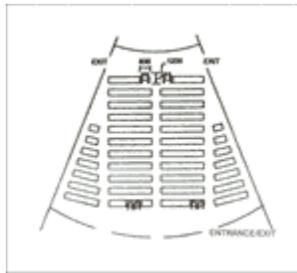


Adequate space is required for a wheelchair user to transfer from the wheelchair to a toilet seat.

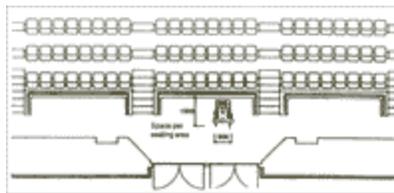
For details of Bathroom and Bedroom, refer details/of Bed Room and Bathroom of Residential Buildings.

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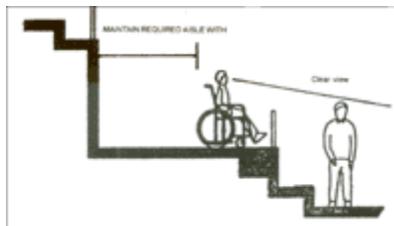
Auditorium



- 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.

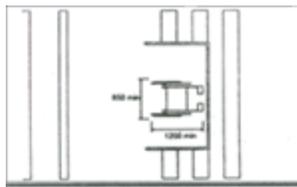


Plan view of guest seating arrangement



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Parks



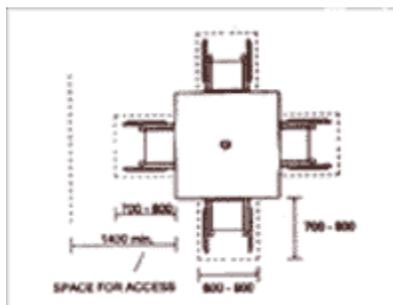
Park road

- These should be no difference in level around an approach to a park and park roads. If a level difference is unavoidable, a ramp or a staircase plus a ramp is needed.

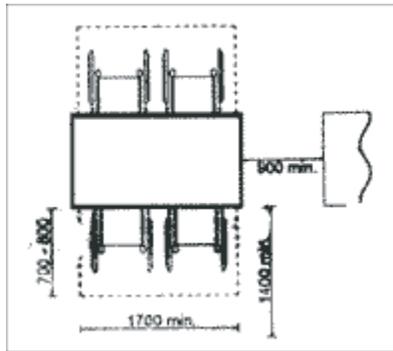
- A level landing should be provided before and after the change in level.
 - For ramp, see the guidelines for "Ramps".
 - For stairs, see the guidelines for "Steps and Stairs".
- Paved surfaces should be made of a non-slip material.
- At locations where there is a difference in level, such as stairs, the surface materials should be changed using a colour contrast scheme and guiding blocks.
- Approaches and pathways should be wide enough for wheelchair users (min. 900 mm. with regular passing places 1800 mm. wide)
- Drainage ditches should not be constructed in park road areas. If a drainage ditch has to be constructed, a ditch cover should be provided.
- Slots in ditch/drain covers must be narrow enough so as not to risk crutched or the tyres of wheelchairs being stuck.
- An information board with information about the facility should be provided for persons with impaired hearing. The board should be designed to be easily legible by using sufficiency large text size, distinct contrast and illumination. The information should also be in Braille.
- Benches, dustbins ad drinking fountains should be installed with adequate space around them for wheelchair users to maneuver.
- Benches should be installed along the side of par roads.
- Guiding blocks should be provided for persons with a visual impairment.

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Restaurant



Access to table



- A space should be provided for wheelchair users at tables.
- A space should be provided for wheelchair user for access to and from the tables.

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Railway Stations

Approach to Station

- The approach should not have a difference in level. If a level difference is unavoidable, install a ramp or a ramp plus staircase.

(The ramp should comply with the guidelines for "Ramps" and the stair should comply with those for "Steps and Stairs").

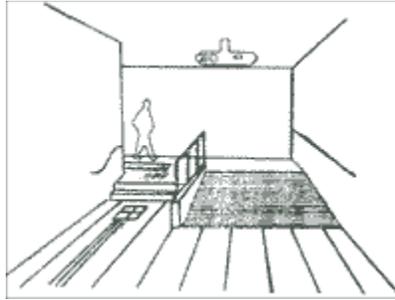
Paved Surfaces

- Pathways should be constructed of non-slip material. At places where there is a difference in level, such as where staircases meet floors, it is desirable that the appearance of the surface material be changed using colour contrast both immediately before and after that area.
- The approach pathway should have guiding blocks for persons with impaired vision (see "Guiding Blocks").
- If the approach pathway is parallel to a road for vehicles, enhance the safety of pedestrians by installing guard rails.

Platform Entrances and Exits

- The station entrance/exit should not have a difference in level. If a level difference is unavoidable, install a ramp or a ramp plus staircase.

(The ramp should comply with the guidelines for "Ramps" and the stair should comply with those for "Steps and Stairs").



- It is desirable that space be marked out near the entrance/exit for vehicles carrying wheelchair users.

(For other details about parking lots, see "Parking/Space").

Reservation or Information Counters

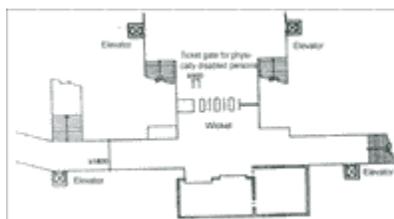
- Reservation or information counters should have unobstructed approaches for wheelchair users.
- Counter heights should not be in excess of 850 mm.

Concourse

- The width of the concourse should be at least 1800 mm.
- The concourse should not have a difference in level. If a level difference is unavoidable, install a ramp, or a ramp plus staircase.

(The ramp should comply with the guidelines for "Ramps" and the stair should comply with those for "Steps and Stairs").

- The floor surface of a concourse should be made of a non-slip material. At places, where there is a difference in level such as stairs, it is desirable that the appearance of the surface material be changed using colour contrast.
- Ensure that columns, signboards, and other fixtures do not protrude from wall surfaces (see "Protruding Objects" Ref. Page No.33).
- Install guiding blocks on the concourse for persons with impaired vision (see "Guiding Blocks" Ref. Page No. 46).



Stairs

- For details, see the guidelines for "Steps and Stairs".

Lifts (Elevators)

- install a lift (elevator) as a means to enable passengers with disabilities to move between floors.
- For the lift (elevator), install two guiding blocks for persons with impaired vision 300 mm. away from the call button.
- For other details, see "Lifts".

WC

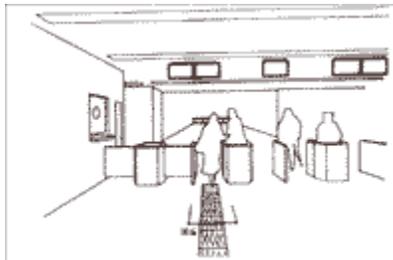
- Install a toilet and washstand suitable for use by wheelchair users and other passengers.



Guiding blocks to ticket gates for persons with impaired vision

Ticket Gates

- At least one of the ticket gates should be wide enough to allow wheelchair users to pass through easily.
- One of the ticket gates should have a continuous line of guiding blocks for persons with impaired vision.
- For other details, see "Guiding Blocks".

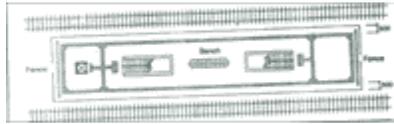


Ticket gates

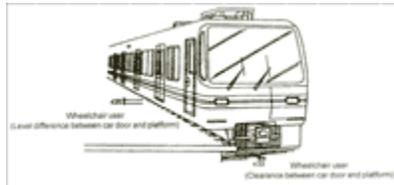
Ticket Vending Machines

- The coin slot should be at a suitable height for easy insertion of coins by wheelchair users.
- A knee recess beneath the ticket vending machines should be provided.
- Install guiding blocks for persons with impaired vision 300 mm. away from the ticket vending machine.

- The fare buttons, cancel buttons and other information buttons should be written in Braille or in a distinct relief pattern.



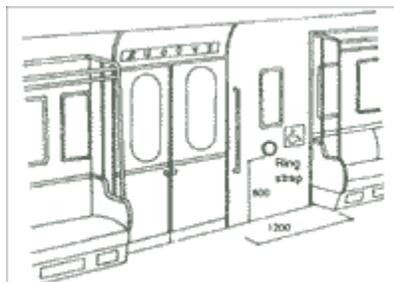
Plan view of platform



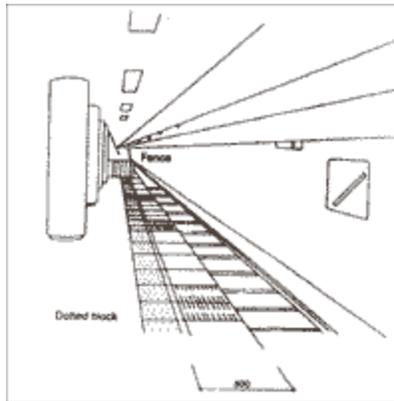
Level difference and clearance between car door and platform.

Platforms

- The platform should have one row of dotted guiding blocks for persons with impaired vision, 800 mm. or more from the edge.
- The paved surface of the platform must be made with a non-slip material.
- Stairs, kiosks and dustbins on the platform must not hinder the clear passage of persons with impaired vision and wheelchair users.
- A bench should be installed on the platform, having guiding block around it.



Wheelchair space and information sign inside the car



Platform

Railway and subway car doors

- Car doors should be wide enough for wheelchair users (minimum 900 mm).
- The gap between car doors and the platform should be reduced to an absolute minimum.

Aisles

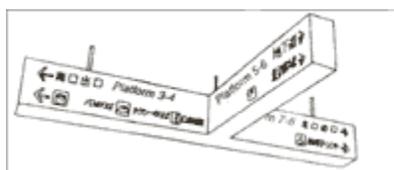
- Aisles should be wide enough for the passage of wheelchair users.

Wheelchair Space

- A space for a wheelchair should be made available at the side of the door.
- The space should be indicated inside and outside the car by using the universally recognized symbol for wheelchair accessibility.
- Install a ring-strap or other appropriate safety grip for wheelchair users to hold on to.

Information

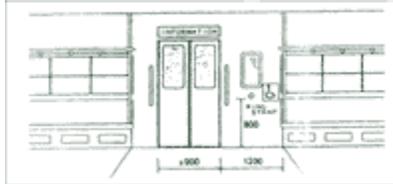
- The information board should be made easily readable by using sufficiently large text size, distinct contrast and illumination.
- It is desirable that in addition to a printed version of train schedule, table of fares and other travel information also be in Braille.
- For hearing impaired persons an electronic sign board of appropriate size & height should be displayed on each platform at conspicuous location for all announcements made by the railways.



Information boards in concourse

Information signs and announcements

- Install a map of train routes
- Announce and provide in each car a visual display of the names of stations and route.



Wheelchair space inside the car

Seats

- An appropriate numbers of designated seats for passengers with disabilities and for elderly should be provided near doors.

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Annexure-A

Model building bye-laws to provide facilities for physically handicapped persons

Bye-Laws

1. Short Title, Extent & Commencement

- a. These bye-laws shall be annexed to the(City) Municipal Bye-laws.
- b. They shall extend to a whole Municipality of(City)
- c. They shall come into force after months from the date of their publication in the official Gazette.

2. Definitions

- a. **Non-ambulatory Disabilities :-** Impairments that, regardless of cause of manifestation, for all practical purposes, confine individuals to wheelchairs.
- b. **Semi-ambulatory Disabilities :-** Impairments that cause individuals to walk with difficulty or insecurity. Individuals using braces or crutches, amputees, arthritics, spastics, and those with pulmonary and cardiac ills may be semi-ambulatory.
- c. **Hearing Disabilities:-** Deafness or hearing handicaps that might make an individual insecure in public areas because he is unable to communicate or hear warning signals.
- d. **Sight Disabilities:-** Total blindness or impairments affecting sight to the extent that the individual, functioning

in public areas, is insecure or exposed to danger.

- e. **Wheel Chair:-** Chair used by disabled people for mobility. The standard size of wheel chair shall be taken as 1050 mm x 750 mm.

3. **Scope**

These bye-law are applicable to all buildings and facilities used by the public. It does not apply to private & public residences.

4. **Site Development**

Level of the roads, access paths and parking areas shall be described in the plan along with specification of the materials.

1. **Access Path/Walk Way:-** Access path from plot entry and surface parking to Building entrance shall be minimum of 1800 mm. wide having even surface without any steps. Slope, if any, shall not have gradient greater than 5%. Selection of floor material shall be made suitably to attract floor material shall be made suitably to attract or to guide visually impaired persons (limited to coloured floor material whose colour 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" (Annexure-I). Finishes shall have a non slip surface with a texture traversable by a wheel chair. Curbs wherever provided should blend to a common level.
2. **Parking:-** For parking of vehicles of handicapped people the following provisions shall be made:
 - c. Surface parking for two Car Spaces shall be provided near entrances for the physically handicapped with maximum travel distance of 30.0 meter from building entrance.
 - d. The width of parking bay shall be minimum 3.6 meter.
 - e. The information stating that the space is reserved for wheel chair users shall be conspicuously displayed.
 - f. 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.

Building Requirements

The specified facilities for the buildings for physically handicapped persons shall be as follows:

1. Approach to plinth level
2. Corridor connecting the entrance/exit for the handicapped.
3. Stair-ways
4. Lift
5. Toilet

6. Drinking water

- A. **Approach to plinth level:-** Every building should have at least one entrance accessible to the handicapped 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 meter having 800 mm high hand rail 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.
 - Stepped Approach:-** For stepped approach size of tread shall not be less than 300 mm. and maximum riser shall be 150 mm. Provision of 800 mm. high hand rail on both sides of the stepped approach similar to the ramped approach.
 - 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.
 - Entrance Landing:-** Entrance landing shall be provided adjacent to ramp with the minimum dimension 1800 mm 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 colour 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' (Annexure-1). Finishes shall have a non slip surface with a texture traversable by a wheel chair. Curbs wherever provided should blend to a common level.
- B. **Corridor connecting the entrance/exit for the handicapped:-** 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.
- C. **Stair-ways:-** One of the stair-ways near the entrance/exit for the handicapped shall have the following provisions:
- The minimum width shall be 1350 mm.
 - Height of the riser shall not be more than 150 mm and width of the tread 300 mm. The steps shall not have abrupt (square) nosing.
 - Maximum number of risers on a flight shall be limited to 12.
 - Hand rails shall be provided on both sides and shall extend 300 mm. on the top and bottom of each flight of steps.
- D. **Lifts:-** Whenever 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.

- a. A hand rail not less than 600 mm. long at 1000 m. above floor level shall be fixed adjacent to the control panel.
 - b. The lift lobby shall e of an inside measurement of 1800 mm x 1800 mm. or more.
 - c. The time of an automatically closing door should be minimum 5 seconds and the closing speed should not exceed 0.25 Meter/Sec.
 - d. 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.
- E. **Toilets:-** One special W.C. in a set of toilet shall be provided for the use of handicapped, with essential provision of wash basin near the entrance for the handicapped.
- a. The minimum size shall be 1500 mm x 1750 m.
 - b. Minimum clear opening of the door shall be 900 mm. and the door shall swing out.
 - c. Suitable arrangement of vertical/horizontal handrails with 50 mm. clearance from wall shall be made in the toilet.
 - d. The W.C. seat shall be 500 mm from the door.
- F. **Drinking water:-** Suitable provision of drinking water shall be made for the handicapped near the special toilet provided for them.
- G. **Designing for children:-** In the buildings meant for the pre-dominant use of the children, it will be necessary to suitably alter the height of the handrail and other fitting & fixtures etc.

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Annexure-1

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 a vehicular traffic.
- d. At the location abruptly changing in level or beginning/end of a ramp.
- e. Immediately in front of an entrance/exit and the landing.

Proper Signage

Appropriate identification of specific facilities within a building for the handicapped persons 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. Public Address System may also be provided in busy public areas.

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 handicapped.

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TAGORE THEATRE GRANTS BY **MINISTRY OF CULTURE**

SUGGESTIONS

NISSAR ALLANA

Revised on September 28, 2011

- 1. GUIDELINES FOR SETTING UP NEW THEATRES
Stage, Backstage, Technical Areas, Auditorium & Foyer**
- 2. INTERNATIONAL INPUTS: WORKSHOPS & VISITS**
- 3. FINALIZING THE THEATRE COMPLEX**

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E-30 Greater Kailash II New Delhi 110 048 ♦ Tel: 29215973 (M) 9810166643 ♦ Email: nallana@rocketmail.com

GUIDELINES FOR SETTING UP NEW THEATRES STAGE, BACKSTAGE , TECHNICAL AREAS, AUDITORIUM AND FOYER

N.B.

Kindly note that the guidelines given below are basic and quite essential for the efficient functioning of the stage facilities and effective lighting. The actual implementation of these will have to be considered in the context of the over-all design of the spaces created.

These guidelines form the basis of New Theatres or, in a modified form, when an older theatre requires re-furbishing.

Individual proposals need to be considered

A Proscenium Stage:

1. Depending on the size of the theatre and seating capacity, the stage dimensions should be an average of 40' – 50' in depth and 45' – 60' in width. No less than 40' width and 40' depth should be considered, even for a small size theatre of about 300 seating.
2. The stage floor should be about 3' - 4' feet above the auditorium ground with the first row of seats, and there should be at least a 6 - 7 feet gap between the stage and first row of seats.
3. The stage height, (proscenium opening) should be about 18' – 22' in height.
4. The height above the stage should be at least double + 8' in relation to the height of the proscenium opening.
5. The wing space should be at least a clear 18' on either side. At least on one side it can be wider (about 25 feet) to provide for the movement of set pieces onto the stage.
6. The wings should be at least 8' in width and about 2 feet higher than the proscenium opening. They should be adjustable to alter the stage width.
7. The cyclorama should have adequate space behind it for back projection. When not used, there should be a heavy moveable black curtain behind the cyclorama, at least 6 – 8 feet behind it.
8. The flies should be a minimum of 4 in number and at least 7 – 8' in height and should stretch sideways from wing to wing. They should be on counter-weight systems.

9. In case there is a wall at the back of the stage, there should be a 7' wide passage behind the cyclorama and the wall for movement of actors etc. from one side of the stage to another behind the cyclorama.
10. There should be a proper grid in the roof of the stage.
11. There should be fly galleries on either side of the stage and in the back of the stage wall, approximately 25 feet in height from the stage level.
12. Cat-walks should be provided in a manner that they do not interfere with the flying systems.
13. The stage floor should be made of wood strips as per standard norms, which would be researched.
14. There should be at least 2 flying curtains on the stage bars, to change the depth of the stage, as per the programme requirements.
15. The front Teaser and Tormentor just behind the proscenium opening should be adjustable to alter the height and width of the stage.
16. Suitable ladders and platform trolleys for fixing and adjusting the lights, should be an integral part of the stage requirements.
17. The front curtain should be on two systems system, so that in case of a failure of one, a bypass system can be used to close the curtain.
18. The Cyclorama at the back of the stage should have standard specifications – to be discussed in individual cases, and should be easily shifted for bringing in big scenery pieces.
19. The access from backstage areas to the wing space should be sufficiently large
20. All stage material for flies, wings, battens and bars etc, should be standard specification, to bring in scenery into the wing space from backstage areas.
21. There should be at least 8 fly bars on counterweight systems for scenery etc.
22. A quick-change room should be available on both sides of the stage, with lights and a mirror and chair.

The Orchestra Pit

23. It is advisable to have an orchestra in the auditorium in front and extending to some degree, below the stage.
24. The width of the orchestra pit should be the same as the width of the stage, and shaped so as not to look obtrusive.
25. The shape, size and entry to the orchestra pit needs to be worked out from below and possibly from behind the stage. The orchestra pit should be provided with suitable chairs, stands for reading musical scores and individual lights on the stands.
26. The orchestra pit should be acoustically, both in its shape and surfacing.
27. The orchestra Pit could be such that it can be covered by extending the stage floor when not in use, so that a permanent gap is not always present between the first row of seats and the stage.
28. The front curtain should be between the stage and the inner edge of the orchestra pit, leaving at least 5 feet in-between for live announcements.

Lighting:

29. There should be at least 4 lighting bars on counterweight systems and 1 cyclorama floor bar near the cyclorama above the stage area.
30. There should be sidelights on suspended ladders in the wings. They should be moveable sideways along the depth of the stage in the wing space. The distance of the light bars from the wings and the adjustable heights, is an important consideration, and should not be less than 4 feet from the edge of the wing. Ideally, the ladders should be able to extend downwards to the floor of the wing space.
31. There should be at least 3 FOH bars with catwalks in the roof of the auditorium for lights, and built in a manner that the access and adjustments of lights should be easy. The middle catwalk should be broad enough to accommodate and operate, follow spots.
32. The angles of the lights should be adjustable vertically and from side to side. The angle of the lights in relation to the stage should be between 50 – 65 degrees.
33. The height of the FOH catwalks should blend into the ceiling of the auditorium, and between the FOH catwalks, there should be enough space so that one does not obstruct the light of the other. Also the angle of the height of the catwalks and the distance from the proscenium should be such that the performers are lit not too much from the top.
34. The roof area in front of the lights, should be set back by at least 5 – 6 feet in a slope which would be not more than 45 degrees, so that the spill from the light beams does not bounce off the slope. Details of this need discussion and clarification.
35. A follow-spot gallery should be provided also at the back of the auditorium at an adequate height.
36. Provisions for installing lights in the side wall of the auditorium, in a proper position and at a proper height, should be provided.
37. An adequate patch should be provided in the lighting booth, along with the DMX control and computer management of the light. The control of lights should be flexible either manually or through computer programming.
38. The lighting booth must be at the back of the auditorium and provide a clear view of the entire stage. There can be adjustable glass panels between the lighting booth and stage, so that the operator can view the stage either through the glass panel or directly.
39. The dimmers can be placed in the backstage area, on the side of the stage in a separate air-conditioned room, and the main fuses should be in the vicinity.
40. Projection facilities for film at the back of the auditorium.
41. For LCD projectors should be provided in at least 3 different places possible for installing the projectors in the auditorium.
42. The number and type of lights/ accessories, filters etc. can be finalized subsequently. This is very important to have in the theatre's inventory.
43. The lighting of the auditorium should be controllable from the light booth, and should be set on dedicated dimmers only for this purpose, and also be operated by automatic/programmed dimmer control, with variable speed.

44. Lamps/lights in the lighting booth should be sufficient, so that the operator has a good view of the control panels, without light significantly spilling into the auditorium.
45. Permanent light points need to be available on the bars above the stage, and in the bars of the FOH. Covered electrical points need to be available in the floor of the stage, in the wings, and in the backstage area.
46. All electrical wiring for stage dynamic lighting needs to be circuited via dimmers, and controllable from the lighting booth. Backstage working lights and footlights which illuminate the backstage area during the shows without spilling onto the stage need to be positioned properly and controllable from backstage itself, and via an alternative circuit in the lighting booth.
47. Working lights need to also be provided from the bars above the stage, but not necessarily from the light bars.

Sound:

48. The sound control can be next to the lighting booth, with a provision for controlling the sound from the back of the auditorium.
49. An adequate and efficient intercom system between backstage and lighting/sound booth should be available. This should be both by cable line as well as wireless and possible to use while moving backstage.
50. A PA system between the sound booth and the stage should be provided through speakers in the auditorium for playback of sound and announcements. This can be used for rehearsals. But walkie-talkies/headsets/mikes are used for silent communications, between the stage, backstage and auditorium. Cordless mikes are used for PA system communications from the auditorium and sound booth.
51. The stage and auditorium should be treated acoustically so that it is possible to use without mikes, for theatre performances.
52. The speakers should be arranged at the appropriate height and width, to give maximum balance when using static sound, and also provide a possibility of panning sound from one side of the auditorium to the other, so that stereophonic and 3 D perception of sound is possible. Sound balancing should be possible through mixers.
53. Mikes for directional and dispersion pick-ups should be part of the sound equipment of the stage.
54. Covered sound points in the stage floor, and in front and on the sides, of the stage, as well as backstage, and on the bars, should be available. The wiring for sound and lights should be kept very separate, as proximity of these cables causes disturbances in sound.
55. No compromises should be made when choosing a sound system. At least 24 channels inputs/outputs should be possible. More are preferable. Possibilities for using wireless mikes should be built-in into the sound system.
56. All dressing rooms should be provided with stage feedback sound, the loudness of which is adjustable, and at a approachable height.

The Auditorium and Balcony:

57. It is advisable to have a balcony in theatres of over 400 seating. Balconies are very necessary when seating is above 500 and more.
58. The rake of the auditorium should be adequate, and its slope should depend on whether there is a balcony or not. It should also provide for getting a good view of the stage floor, but not be excessive that the audience views the actors from too much above, and sees more of the performers heads than the face.
59. The seating in the auditorium needs to be staggered so that the seat in the row behind, is in-between the two seats in front..
60. The depth of the stage should not exceed permissible acoustic limits.
61. The rake of the balcony should provide for a view of the complete front of the stage from the first as well as last rows.
62. The last row of the balcony should not cut more that 10% feet height of the cyclorama height, by the height of the proscenium arch.
63. The vertical sightlines of the height of the cyclorama should not be compromised in the last row of the ground floor of the auditorium, by the lower edge of the balcony.
64. The sightlines of the stage from the auditorium need to be carefully worked out, so that extremes on the sides of the auditorium are not compromised beyond 10 - 12% view of the full stage
65. There should preferably be aisles on either side of the center block of seats, rather than a central aisle.
66. All entries to the auditorium need to be in the side of the auditorium, and if required at the back, the entry should in line with the side aisles, and not in the central position. .
67. All entries into the auditorium should either be double doors, leaving safety fire escape margins, or at least should be masked by a thick curtain or side wall, so that persons entering the auditorium late do not disturb the performance by extraneous lights.
68. All entries into the auditorium should be through an internal passage from the theatre foyer. No entry into the auditorium should be directly from the exterior.
69. The auditorium even through sometimes accommodating over 500 persons, should have an intimate relationship with the stage, so that the performers are seen properly.
70. It is advisable to paint the inside auditorium and have seat covers a neutral colour to enable the performance to take preference over the décor. Also to keep in mind that lights hanging from the light bars are an essential part of theatre and do not hamper the aesthetic of the auditorium.

The Backstage Dressing Rooms.

71. The situation of the Dressing rooms could be behind the stage in the centre or sides or below the stage. In ALL cases, easy, unhindered and quick

- accessibility to the stage is of the essence. Ideally there should be at least 6 Dressing Rooms, 4 for individuals or for 2 persons, and 2 for groups.
72. The Dressing Rooms should be fitted with the following: chairs and make-up tables with lights, a small wardrobe, separate toilet/s and showers, a wash basins with mirrors, hanging racks, a sofa-cum-bed, and small side tables.
 73. The Dressing Rooms should have audio feedback from the stage, and from the stage manager's desk, with adjustable volume control.
 74. A separate area in proximity of the Dressing Room should be available for pressing of clothes/costumes.
 75. There should be passages from the Dressing Rooms to the wing space on either side of the stage. The entry from the passage to the wings space should be wide.
 76. It is essential to place a safe where performers can keep their valuables.

Backstage areas construction/storage areas:

77. A scenery room, a prop room, a wardrobe room, a music room, a lighting storage room and a general area, are essential features of a good theatre. These will vary in size, so that the largest one will be the area housing, or making smaller scenery.
78. Access to the scenery rooms should be easy, and it should have a landing area just outside, to enable a truck to approach it, and unload scenery. Wide access doorways, preferably of the folding type, with 14 – 16 feet high and 12 – 14 wide access should be for loading scenery into the backstage area.
79. Access from the scenery room to the wing space should be unencumbered.
80. There should be at least 15 platforms of varying sizes, and legs for adjustable heights, for the use of groups. These would be under the care of the stage manager, who should be responsible for their proper use, by groups
81. Adequate storage space in a theatre is essential, so that, for the lack of space, sundry objects are not lying around in spaces meant for special storage.
82. Ideally backstage should be painted black or a dark neutral colour.
83. If all the toilets are in the green rooms then it is also necessary to have 1 or 2 toilets that are separate from the green rooms – for use by the technical team, stage managers etc.
84. Side rooms for stage manager, lighting unit and backstage crews are advisable. These rooms should be fitted with computers, telephone/ intercom phones, internet etc like a miniature office and resting room, used on the days of the shows

Rehearsal Rooms:

85. It would be advisable to provide two rehearsal spaces in a theatre complex.
86. The rehearsal spaces should have wooden floors if possible, or a good quality linoleum flooring.
87. The rehearsal spaces should be equipped with a good sound playback system.
88. Rehearsal spaces should have chairs, tables and a couple of sofas.
89. Lighting in the rehearsal rooms should be good.

90. The size of the rehearsal room should be 24 X 36 feet minimum. A height of at least 12 feet is useful.
91. One wall of the rehearsal room should have large mirrors, with a curtain, which can be used to cover the mirror if required.

Front of House Amenities. (courtesy Sanjana)

92. It is important to think of simple and comfortable seating for the audience to wait before the auditorium gates are opened before the show or in the interval.
93. The foyer should avail performing groups of a display area – to display photographs, posters etc.
94. A canteen or café is essential to create a hangout space / an *adda*. Most importantly to cater to the rush during interval time.
95. Wide serving counters for serving refreshment in the interval should be available in the area adjoining the main foyer.
96. Adequate toilets are essential.
97. Storage spaces for umbrellas, raincoats, items not allowed into the auditorium for security reasons, should be available.
98. Merchandising stall is a good idea, where the complex or the performing groups can sell their merchandising goods.
99. A Book Shop & Art Gallery is are always a pleasant addition to a performing space – that invite audience members to come early and brose around.
100. The Box Office should be easily accessible.
101. An open free performance space is always a good thing to keep in mind – for short performances or live music before the main show, outside the main auditorium.
102. Conveniences such as parking facilities, public transport, accessibility etc all play an important part of the life of a cultural centre.

INTERNATIONAL INPUTS: WORKSHOPS & VISITS

When the theatres which were designed by architects presenting projects for funding of Tagore theatre complexes were examined by the expert committee, it was found that all the theatres designed were grossly lacking in a proper awareness of the requirements of theatre technology and basic theatre requirements.

Since a large amount of funds were being disbursed on this special occasion of Gurudev Tagore's centenary celebrations, to build new theatre complexes, or for refurbishing older ones, by making structural changes, it was felt by the committee that a special set of guidelines should be provided to the agencies presenting projects for funding. In this manner the theatres that were build would serve many purposes besides the local use for which it was planned.

Theatre if properly built, would have the appropriate facilities and could serve to host the best Indian work that would travel to these cities, as well as the hosting of international theatre companies traveling to India. The purpose and use of these theatres would be manifold, and thus justify the enormous expense that was being incurred.

It was stressed several times, during the deliberations by the expert committee in which there was also Shri K. T. Ravindran, eminent architect, that there was no training in architecture schools on the designing requirements of theatres. The result of poor theatre designing was clearly discernable in the vast multitudes of theatres built in India.

While the Tagore theatres/Rabindralayas built in the 1950's and 1960's were essentially reasonable good examples of basic theatre designs, there was much left to be desired in the contemporary context, as all these theatres require major changes. In some cases, it would be more reasonable to re-build the theatres, rather than attempting cosmetic changes. This is because major structural changes would be necessary in these cases.

One of the examples of a somewhat better theatre built in recent times, was the Bhabha Theatre (JBT) at the National Centre for the Performing Arts, Mumbai. However this also had several significant limitations, and could not be treated as an ideal example.

The Kamani Auditorium in Delhi, is also a reasonably good theatre, and very functional. However, there are many limitations and at this moment in time, when

almost Rs. 200 crores are being spent as grants to improve/build new theatres, the committee suggested international inputs in the following manner:

Dr. Allana was familiar with many new theatre complexes that have been recently build in Oslo, Gateshead, the New York, and Singapore. Sanjana Kapoor also suggested theatres in London and Prof. Anuradha Kapur mentioned that National Theatre of Japan was a very good example of a very good theatre.

INTERNATIONAL WORKSHOP ON THEATRE ARCHITECTURE:

It was suggested that a 3-day workshop with international theatre architects be held in Delhi, in which the architects could outline certain essential aspects of building good theatres, with as wide a function as possible. Experts in sound engineering could also be involved in the workshop, as this was also an area, which was not sufficiently developed in the context of theatre design in India. Other architects, even those not involved in the projects, but interested in knowing more about theatre architecture, could join the workshops. Dr. Allana could coordinate with the architects about conducting the workshops.

1. It was also felt that while this kind of workshop would be of great use, it was not sufficient for architects designing the theatres for which the Ministry of Culture was giving a large amount of funding, to understand these theatre concepts, without actually experiencing and visiting some of the very good examples of theatres abroad, as well as a few theatres in India.

It was therefore suggested that accompanied by Dr. Allana,, the architects involved in the projects under discussion, the architects cshould visit some of the most important theatre centres abroad. This would help the architects to reformulate their ideas, with anew perspective including:

The Esplanade Theatre complex in Singapore
 The National Theatre of Japan
 The Ballet & Opera House in Oslo, Norway
 The Theatre Arts Complex at Gateshead, Newcastle, UK
 The National Theatre complex in London
 The Young Vic in London,
 The Barbican Theatre in London
 The Traverse theatre, Edinburgh, UK
 Donmar Warehouse, London, UK
 The Kennedy Centre, in Washington DC
 The Lincoln Centre in New York.

The theatres in India, which need to be looked at and discussed with the architects could be the following:

The Jamshed Bhabha Theatre (JBT) at NCPA
Kamani Auditorium in New Delhi
Rabindralayas in Kolkata, Mumbai and Lucknow

It was suggested that above process of workshops, travel etc. could be completed by December 2011. Funding for the above could be worked out as per the convenience of the Ministry.

FINALIZING THE THEATRE COMPLEX:

It was proposed by the committee that after the inputs received by the architects, who would be responsible for designing the theatre/complexes concerned, they would make the final plans, which would be scrutinized by the expert committee again, for any suggestions, and dialogue with the architects in question.

MONITORING OF APPROVED PROJECTS PROGRESS

It is critical to set up a clear monitoring system for us to ensure that the work is being undertaken as per the agreement – and we may need to get local representatives who can do the job. It is the job that we need to define very clearly to ensure the project is going according to plan – both architecturally and from a theatre practitioner's perspective. Monitoring should take place before every installment of payment.

Nissar Allana

TAGORE THEATRE GRANTS BY
MINISTRY OF CULTURE

SUGGESTED GUIDELINES
FOR RUNNING THEATRE SPACES/COMPLEXES

Sanjna Kapoor

September 20, 2011

GUIDELINES FOR RUNNING THEATRE SPACES / COMPLEXES

AIMS

- The space/complex should have a clear aim/objective.
- Each space in your complex needs its own specific aims. An auditorium conceived for multi-purpose use is not advisable, as it invariably ends up serving nothing.
- The specific aims of each space should connect to the overall aim of your complex.
- The overall aim of the complex and the specific aims of each separate space should be clearly articulated in writing and publicly available.

ANNUAL CALENDAR

- The annual calendar of activities at your complex should serve and be consistent with the aims and objectives of the complex. This should apply regardless of whether the spaces are rented out or curated.
- It is advisable to have a plan for an annual calendar – envision the year ahead.
- A clear rental structure needs to be in place and publicly available. Hidden costs are not advisable; it is best to be completely transparent.
- A clear application procedure needs to be in place and publicly available. The procedure should include timeframes within which applicants can expect a response.

THEATRE EXPERIENCE

- Groups should be clear when the theatre is available to them, as well as the timings of the technical facilities & staff etc.
- The maintenance plan for the auditorium, backstage, dressing rooms etc including front of house needs to be in place.
- A technical maintenance plan needs to be in place.
- A plan to minimize latecomer's disturbance (to the audience and performers) into the auditorium should be in place and strictly adhered to. You could either simply not permit latecomers or have a system for quietly and discreetly seating them without disturbing the performers and the rest of the audience. (It is a good idea for the tickets to carry a mention of the way latecomers will be handled in your space).
- Make sure that information regarding parking facilities and public transportation is easily available to your audiences (printing this information on tickets is a good idea).

AUDIENCE DEVELOPMENT

- Audiences don't just come to the theatre – they have to be encouraged. You should have a clear plan to generate audiences for the complex.
- Your plan should include staying in touch with your audience regularly. Make sure you have an idea of the various media available to you to enable this (don't forget the free and easy to use internet!)

- Audience should be able to access information of your shows and programmes easily.
- Tickets should be easily available (remember there are also various home delivery and on-line services available).
- It is always a good idea to have spaces that invite audiences to 'hang out' and simply 'be' in the space. This builds a certain life in your complex that contributes to its vibrancy, and encourages audiences to return.
- A food/snacks plan is essential. Keep in mind that the interval audience must be catered to in less than 10 minutes!

ADMINISTRATIVE STRUCTURE

- Aim to create a professional working structure where there is responsibility, authority and accountability within the framework of the overall aims of the complex.
- It's a good idea to have a Board that will help you stay on track and contribute to your over all-functioning.
- Have a clear management and staff structure
- Have clear job profiles and expectations clearly delineated.
- Salary structure must be clear, as must be a system for raises, appraisals etc.
- An annual narrative & financial reporting system should be in place. These reports should be easily accessible to the public.

PLANS

- A 5-year plan must always be at hand, which will serve as a guide to your functioning, as well as a check and reference document.
- A Financial Plan must be generated for a 5-year period as well, outlining sources of income and expected expenditure. This financial plan needs to be in sync the 5-year plan of programming and activity.
- The financial plan should include ways of generating income as well. However, it is critical that the core ideals of the complex are not compromised to generate finances and sustainability. Remember that the finances are to serve the complex, not the other way around.
- It is advisable to create opportunities of networking and working with partner organisations in the same field from the region, country or internationally. This partnership strengthens the capacity of your institution and enlivens the venue.

NOTE:

The management of the complex needs to be in service of the arts (and not the other way round!); and the management needs to provoke, contemplate and develop a deeper capacity of strategic thinking and openness toward different interest in art management, to help enhance a greater professionalism and overall development of arts practice in India.

GLOSSARY

Curated : to select the performances at the venues, to have a clear-cut or reason for selection i.e. quality, sustainability, professionalism etc.

* * *

GLOSSARY

Acoustic treatment - Acoustic treatment is the process used to minimize the decibel level (volume) or wave interference of a sound emitted from its source with respect to a receiver. The receiver can refer to a human, a sensitive piece of scientific equipment, or recording equipment in a studio. Rather than simply 'turning down' the volume level of a sound source, (which is not always possible. Drum kits, for example, do not have volume knobs) acoustically treating the surrounding environments with specific materials allows you to control the level of sound without compromising the quality output of your source.

Apron - The apron is any part of the stage that extends past the proscenium arch and into the audience or seating area. The Elizabethan stage, which was a raised platform with the audience on three sides, is the outstanding example. Most stages edges are curved slightly outward providing a very small apron. Some have a large playing space protruding into the audience and in turn a very large apron.

Auditorium: The section of the theatre designated for the viewing of a performance. Includes the patrons main seating area, balconies, boxes, and entrances from the lobby. Typically the control booth is located in the back of the auditorium, although for some types of performance an audio mixing positing in located closer to the stage within the seating.

Catwalk - A catwalk is a section of the house hidden in the ceiling from which many of the technical functions of a theatre, such as lighting and sound, may be manipulated.

Cyclorama - A cyclorama is a large curtain or wall, often concave, positioned at the back of the stage area. It was popularized in the German theater of the 19th century and continues in common usage today in theaters throughout the world. A "cyc" (U.S. theatrical abbreviation) can be made of unbleached canvas (larger versions) or muslin (smaller versions), filled scrim (popularized on Broadway in the 20th century), or seamless translucent plastic (often referred to as "Opera Plastic"). Traditionally it is hung at 0% fullness (flat). When possible, it is stretched on the sides and weighted on the bottom to create as flat and even a surface as possible. As seams tend to interrupt the desirable smooth surface of the cyclorama it is usually constructed from extra-wide material.

Cyclorama Flood Bar – It is the bar for rigging the light equipments to lit up the cyclorama.

DMX - DMX is a standard for digital communication networks that are commonly used to control stage lighting and effects. It was originally intended as a standardized method for controlling light dimmers, which, prior to DMX512, had employed various incompatible proprietary protocols. However, it soon became the primary method for linking not only controllers and dimmers, but also more advanced fixtures and special effects devices such as fog machines and moving lights, and has also expanded to uses in non-theatrical interior and architectural lighting; DMX512 has been used at scales ranging from strings of Christmas lights

to electronic billboards. DMX512 employs EIA-485 differential signaling at its physical layer, in conjunction with a variable-size, packet based communication protocol. It is unidirectional and does not include automatic error checking and correction.

Fly - A fly system, flying system or theatrical rigging system, is a system of *lines* (e.g. ropes), *blocks* (pulleys), *counterweights* and related devices within a theatre that enable a *stage crew* to quickly, quietly and safely *fly* (hoist) components such as curtains, lights, scenery, stage effects and, sometimes, people (e.g. Peter Pan). Systems are typically designed to fly components between clear view of the audience and out of view, into the large opening, *fly loft*, above the stage. Fly systems are often used in conjunction with other theatre systems, such as *scenery wagons*, *stage lifts* and *stage turntables*, to physically manipulate the *mise-en-scène*.

Fly Gallery - A narrow elevated platform at the side of the stage in a theater, from which a stagehand works the ropes controlling equipment in the flies.

FOH - Front of house (abbreviated FOH) is primarily a theatrical term, referring to the portion of the building that is open to the public. In theatre and live music venues, it typically refers to the auditorium and foyer, as opposed to the stage and backstage areas. In theatre, the front of house manager is responsible for ticket sales, refreshments, and making sure auditorium is set out properly.

Green Room - Green room is that space in a theatre, a studio, or a similar venue, which accommodates performers or speakers not yet required on stage. The green room functions as a waiting room, or as a touch-up lounge so that a performer need not return to wardrobe or to the dressing room, while remaining immediately available for a call to the stage. The origin of the term is often attributed to such an area historically being painted green, yet the modern "green room" is often not green at all.

Masking – It is the technique through which one can cover the area to hide it from the audience.

Orchestra or Orchestra Pit - In productions where live music is required, such as ballet, opera, and musicals, the orchestra is positioned in front and below of the stage in a pit. The pit is usually a large opening ranging from 4'-6' wide, 20'-30' long and 6'-10' deep. Some orchestra pits have lifts or elevators that can raise the floor of the pit up to the same height as the stage. This allows for easier movement of instruments among other things. Often an orchestra pit will be equipped with a removable pit cover which provides safety by eliminating the steep drop off and also increases the available acting area above. In most cases, some sort of lattice or sound port is built into the front of the orchestra pit, to allow audience members in the front rows to hear the music while still having a wall to keep them separated from the orchestra

Patch Panel - A patch panel or patch bay is a panel, typically rack mounted, that houses cable connections. One typically shorter patch cable will plug into the front side, whereas the back holds the connection of a much longer and more permanent cable. The assembly of hardware is

arranged so that a number of circuits, usually of the same or similar type, appear on jacks for monitoring, interconnecting, and testing circuits in a convenient, flexible manner.

Proscenium - A proscenium theatre is a theatre space whose primary feature is a large frame or arch (called the *proscenium arch* even though it is frequently not a rounded archway at all), which is located at or near the front of the stage. The use of the term "proscenium arch" is explained by the fact that in Latin, the stage is known as the "proscenium", meaning "in front of the scenery."

In a proscenium theatre, the audience directly faces the stage, which is typically raised several feet above front row audience level, and views the performance through the proscenium "arch". The space that holds the audience is called the "house". The main stage is the space behind the proscenium arch; it is often delimited by a front curtain that can be lowered or drawn closed. The space in front of the curtain is called the "apron". The stage-level areas obscured by the proscenium arch and any curtains serving the same purpose (often called *legs* or *tormentors*) are called the *wings*, while the space above the stage that is concealed by the top of the proscenium arch is called the *fly space*. Any space not viewable to the audiences is collectively referred to as *offstage*. Proscenium stages range in size from small enclosures to several stories tall.

In general practice, a theatre space is referred to as a "proscenium" any time the audience directly faces the stage, with no audience on any other side, even if there is not a formal proscenium arch over the stage. Because it seems somewhat incongruous to refer to a proscenium theatre when no proscenium arch is present, these theatres are sometimes referred to as "end-on" or "end-stage" theatre spaces.

Proscenium Opening – It is the clear distance between the two proscenium walls.

Sightline - A sightline, or sight line, is a normally unobstructed line-of-sight between an intended observer (or spectator) and a stage, arena.

Stage Manager - A stage manager is essentially the head traffic controller of a live theater or television production. Once the director has issued his or her final notes to the cast, the stage manager usually assumes command of the physical stage area. All of the various technical crews, such as lighting, sound, props and scenery, report directly to the stage manager, who in turn remains in constant communication with the director by in-house phone or wireless headset. The head stage manager has a number of duties to perform, some of which may be delegated to other stage managers or assistants.

During the rehearsal process, the stage manager's most important role is to record all of the blocking, lighting cues, prop usage, costume changes and entrances of all the performers. This usually requires shadowing the director and taking copious notes. A stage manager is also responsible for scheduling rehearsal times and making sure those times are respected. During rehearsals, it falls on the stage manager to make sure understudies have sufficient time to learn their roles in case of an emergency. The stage manager is also bound by theater tradition to supply the daily coffee before rehearsals begin.

Teaser - The teaser is a horizontal masking border that is lowered to reduce the height of the opening. It is attached to a batten and suspended just upstage of the proscenium, directly behind the grand drape or act curtain. The teaser can be lowered into position to set the stage height as required by the current scene.

Tormentor - Tormentors or "side maskings" are vertical masking pieces used in conjunction with a teaser. In a traditional setting the tormentors should be mounted upstage of the grand drape and on the same plane as the teaser. While various mounting methods may be used, a tormentor is typically attached to a pipe which is then mounted to a traveler track. The track will allow the tormentors to be drawn onstage to reduce the proscenium opening to fit the current scene. In many installations the pipes will be equipped with a swivel component allowing the tormentors to rotate into an angle, or even reverse to reveal an alternate fabric or finish.

Wings - Areas that are part of a stage deck but offstage (out of sight of the audience). The wings are typically separated using drapes (usually black). Often there will be 2, 3, or even 4 different "portals" which consist of a wing curtain (or leg) on each side of the stage and a teaser drape (or border.) It is used for performers preparing to enter, storage of sets for slow changes and as a stagehand work area. Wings also hide technical equipment, such as lights which project from the side of the stage