DESIGNING BRT SYSTEMS FOR UNIVERSAL ACCESS
CASE OF AHMEDABAD AND INDORE

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SUMMARY
Big investments in urban transportation infrastructure are being made and anticipated at the national level, channelized at the local level through JNNURM and NIJNNURM reforms in India. This paper argues the need to use this nationwide infrastructural transformation as an opportunity to include groups that have hereto been physically marginalized from urban systems. As cases, this paper looks at the efforts undertaken in two cities – Ahmedabad and Indore – in adopting universal access guidelines in planning and building their BRT systems. It evaluates the design issues for BRT stations, their impact on accessibility and suggests and prioritizes design solutions.

Key Words: bus rapid transit stations, universal accessibility, Ahmedabad, Indore

INTRODUCTION

Ten to 12 percent of the world's population lives with a moderate to severe disability — that is about 700 to 800 million people, or more than twice the population of the United States. Eighty percent of this group are in developing countries; and among those who are of working age, unemployment hovers around 80 to 90 percent. [Broadus, 2010]

India has the largest number of disabled people in the world. While estimates vary, there is growing evidence that people with disabilities constitute 4 to 8 percent of the Indian population (around 40-90 million individuals). Between 1990 and 2002, disability is predicted to have doubled due to injuries/accidents. [World Bank, 2007] In other words, disability will only increase in the next decade if status quo is maintained.

According to a World Bank Report (2007), disabled people have much lower educational attainment rates, with 52 percent illiteracy against a 35 percent average for the general population. Further, the employment rate of the disabled population is lower (about 60 percent on average) than the general population, with the gap widening in the 1990s.The report also found that there was a decline in the employment rate of working age disabled people, from 42.7 percent in 1991 to 37.6 percent in 2002. [World Bank, 2007]

The large majority of people with disability (PWD) in India are capable of productive work; however, their participation is limited mainly due to a range of environmental, educational and social barriers. [World Bank, 2007] For instance, a person in a wheelchair might not be able to find work - this is not always because of the disability, but more often than not because of a physically unfriendly environment that is usually populated by inaccessible buses, absent sidewalks, or staircases instead of ramps.

There is a shift in disability thinking from the medical and charity models towards social/ environmental model. [Aggarwal, 2004] It is argued that disability is not a static condition but an interaction between an individual and a non-inclusive society. The United Nations Convention on the Rights of Persons with Disabilities loosely defines disability in its preamble as “an evolving concept” that results from “the interaction between persons with impairments and attitudinal and environmental barriers that hinder full and effective participation in society on an equal basis with others”. [Babinard, 2010]

This paper focuses on such physical barriers especially in Bus Rapid Transit (BRT) systems, which are fast gaining attention and big investments across the country. Pune, Delhi and Ahmedabad already have operational BRT systems and other cities like Jaipur, Surat, Indore, Naya Raipur, Hubli-Dharwar and Bhopal are in the process of building their systems.

Further, the High Power Executive Committee (HPEC) appointed to review the progress of the first phase of JNNURM[i] projects in India recognizes the role of BRT systems in the transformation in the cities of Ahmedabad and Bhopal. It endorses road-based Mass Rapid Transit for cities with population of 1 million and above. The HPEC estimates an investment of 39.2 trillion in urban infrastructure, of which 44% is estimated for urban roads and 14% for transport and traffic support infrastructure. [Ahluwalia, 2011] With such large investments being directed towards developing transport networks, there is a great opportunity to build inclusive urban systems that trigger economic growth and include diverse populations.

In India, the *Persons With Disabilities (Equal Opportunities, Protection Of Rights And Full Participation) Act*, 1995 [Mo, 2012] and three key Indian standards such as the National Building Code (2005), Guidelines and Space Standards for Barrier Free Built Environment for Disabled and Elderly Persons (1998) and Manual Barrier Free Environment, O/o the Chief Commissioner for Persons with Disabilities (2002) prescribe guidelines and space standards to allow for universal access to public buildings, streets, buses, bus stops and railway stations. However, these codes exist in isolation and do not relate with each other as part of a more comprehensive urban strategy to include persons with disabilities. Further, since BRT systems are fairly new in India there are no specific guidelines, codes or standards for accessing bus rapid transit systems in the Indian context.

This paper attempts to create a framework for evaluating universal access to BRT stations, with a special focus on the physical design. While the feeder services, fare collection, bus features and training are equally important, it is not within the scope of this paper. However, it is acknowledged that a long-term planning process is required to incorporate these with special attention to improve feeder line infrastructure.

This paper looks at efforts undertaken in two cities – Ahmedabad and Indore – in adopting universal access guidelines in their BRT stations. It evaluates the design components, their impact on accessibility, and suggests and prioritizes design solutions.

METHODOLOGY

Several Indian and international guidelines have been referred to create a framework for the evaluation of universal access to and within Bus Rapid Transit (BRT) systems.[7]

These guidelines create a framework and a larger narrative for universal accessibility based on BRT systems in Latin American countries. They emphasise the need for public consultation processes, including access-for-all features during the design process, city-wide and system wide consistency in infrastructure provision, an emphasis on getting the finer details right and using access audits to evaluate accessibility for PWD.

These guidelines recommend following the travel path of a passenger using the BRT system. A similar method has been used here. The framework follows an "accessibility chain" beginning with sidewalks, pedestrian crossings along the trunk line corridors, continues into the stations and focuses on station features. Further lessons are drawn from Rea Vaya BRT in Johannesburg, South Africa, where Aileen Carrigan, Senior Associate, Research and Practice in Embarq evaluated these stations for universal accessibility; and Abhishek Ray, an architect advising the Western Railways in improving universal accessibility along their corridors and stations in Mumbai.

The cities of Indore and Ahmedabad were selected for this study as a result of the ongoing partnership of EMBARQ-India with the respective agencies in planning and implementing components of the BRT systems. The comparative analysis of Indore and Ahmedabad stations highlight the strengths of their design and areas for improvement. The priority of the proposals is based on their impact on accessibility. The priorities are classified as *High*, *Medium* and *Consider* depending on their impact on accessibility. Those components classified as High can inhibit accessibility of PWD whereas those classified as Medium or Consider improve the experience of a PWD.

1. Case Studies

1.1 Ahmedabad BRT (Janmarg)

The Ahmedabad BRT system, also known as Janmarg, is planned for a network of about 155km. Ahmedabad Janmarg Limited (AJL) is constituted as a Special

[7] These can be found in the Reference section of the paper.

Purpose Vehicle to operate the system. Currently 54km is built and approximately 66 stations are operational. Each station costs around 4.4 million.

In Janmarg, all the stations from RTO circle to Naroda are evaluated. Therefore the evaluations are generic and not specific to one particular station. It is worthwhile to note that the planners in Janmarg conferred with the Blind People's Association on provisions for universal access and these have been incorporated.

1.2 Indore BRT

In 2008, Indore was approved to receive a grant from the government of India to construct segregated infrastructure for a Bus Rapid Transit (BRT) system on a 12 km pilot stretch on one of the major roads - AB Road. [EMBARQ, 2010] There will be 21 BRT stations along the pilot corridor. The stations are located at the median of the road. Each station is approximately of size 65 m x 4.5 m. The stations are designed with double bus bays on each side. The cost of each station is around 7.5 million. Six of the 21 stations are currently being built.

The entire network is planned for 88 km of segregated infrastructure. The project is to be implemented in two phases; 47km in phase I and the remaining in phase II. The bus system is estimated to provide for 50 percent of the travel demand by 2021.

EVALUATION

1. Access at Trunk Level Stations

Component	Impact on Accessibility	Janmarg Stations	Indore Stations	Possible solutions	Priority
1. Ramps to stations					
i. Crossing depth before ramp	• The pedestrian crossing depth should accommodate wheelchair users.	• The pedestrian crossing is at least 1200mm wide.	• The pedestrian crossing depth is not indicated in the drawings.	• Ensure that the pedestrian crossing is atleast 1200-1500mm wide.	• High
ii. Ramp slope	• A slope greater than 1:12 makes it difficult for people with limited mobility.	• The access ramp was planned as 1:12. Currently it is 1:10/11. The new stations are currently planned for 1:14.	• The access ramp is planned for a slope of 1:20.	• Ensure a slope of at least 1:12. The ideal slope is 1:20.	• High
iii. Ramp mid - landing depth	• Inadequate mid-landing prevents wheelchair users from resting halfway up ramp	• Currently not required, as the ramps are not longer than 9m.	• Mid-Landing is 1500mm deep.	• Ensure that if the ramp length exceeds 9m, a mid-landing area of the ramp width (or at least 1200-1500 mm) assists passengers with limited mobility to navigate the ramp into the station.	• High
iv. Ramp landing in front of ticket booth	• Wheelchair users require sufficient space to turn around in front of ticket booth. • It is difficult for wheelchair users to wait on a slope, so providing a landing will allow a wheelchair user in line for the ticket booth to wait on a level surface.	• Landing is at least 1500mm in front of the ticket booth.	• Landing is 1500mm in front of the ticket booth.	• Ensure there is a level landing at least of 1200-1500mm between the top of the access ramp and the front of the ticket booth.	• High

v. Wall adjoining ramp	• A high wall obstructs the view of people with wheelchairs to see approaching buses along the bus ways. • Railings along the wall can provide support to people with limited mobility. • Adequate distance from the wall allows for comfortable hand grips of the handrail.	• Currently the height of the wall adjoining the ramp is 1148 mm at the bottom. • No railing along the wall on both sides to provide support to people with limited mobility.	• Currently the wall adjoining the ramp is 1800mm at the bottom. • Sharp top edge extends towards pedestrian crossing and may harm users. • Railings do not extend along the entire length of the wall. • Height of the railings along the ramp and stairs not determined. • Gap between railing and the wall is 35mm.	• Ensure that the height of the adjoining wall along the access ramp is low enough for a person on the wheel chair to see. • Consider redesigning the sharp profile of the wall to a straight edge. • Provide continuous hand rails along entire length of the wall. Ensure top of handrail is 900mm above the ramp/ stair. • Ensure that the railing is U-shaped and that the gap between the wall and the railing is atleast 50mm.	• Medium • Consider • High • High
vi. Tactile guideways and warning strips	• All users would benefit from cues identifying the edge of the station, bus lane, mixed traffic lane and from cues for change in ramp slope gradients. • It is hazardous to all users but especially blind persons or those with low vision, not to indicate where a staircase begins/ends.	• There are 300mm tactile guideways along the entire length of the station. • The guideways do not cross the bus way. There is no tactile warning strip to indicate the threshold between station, bus way and mixed traffic lane. • The tactile guideways are in the centre without any hand rails. • The tactile warning strips do not extend over entire width of the ramp/stair/step.	• There are 300mm tactile guideways along the length of the station and ramps. • They are placed in the centre of the railing at the ramp entrance. • The tactile warning tiles are placed within the guideways. • The tactile guideways in centre of steps positions users away from handrails. • Drawings suggest warning tiles are placed where ramp slope changes but the warning indicators do not cover the full width of the ramp. • Top or bottom of steps is not identified with warning tiles. There are tactile warnings on the intermediate steps.	• Ensure that the guideways have a clear obstruction-free path. • Provide guideways close to the hand rails along the ramps/ stairs so that blind people can take support from it. Where tactile guideways are already inserted, provide hand rails on one side for support. • Extend the tactile guideways across the bus way, road and sidewalks. They should be at least 300-400mm wide. • Mark the thresholds with tactile warning strips of atleast 300mm width. 560-600mm width is preferable. • Consider extending the tactile warning strips over entire width where the ramp slope changes and before the top and bottom step. The strip should be atleast 560-600mm wide. • Consider eliminating the tactile warnings on the stair treads.	• High • Medium • High • High • Consider

2. Station entrances and exits	• Station entrance and exit widths should accommodate people in wheelchairs. • Station ramps allow access for people on wheelchairs and are easier for people with limited mobility.	• The entrances and exits are 900mm wide. • Some stations have a ramp on one side and steps on the other.	• The entrances and exits are 1000mm wide. • All stations have a ramp on one side and stairs on the other. .	• Ensure a minimum width of 900 mm at station entrances/ exits. • Consider ramps on both sides of the station. If site conditions do not permit, indicate which side is accessible to people with wheelchairs through appropriate signage. It is preferable to have a ramp towards an intersection with enough distance for a refuge area of minimum 1500mm.	• High • Consider
3. Ticket counters	• A person in a wheelchair should be able to reach the ticket counter to communicate with the attendant. • Softer edges of the counter are safer, especially for people with limited vision.	• The ticket counter is 1200mm high • Holes in the booth glass are too high for a wheel chair user. • Ticket counter has sharp corners that could hurt persons with limited vision.	• Ticket counter is 900mm high, with 500mm depth. • Ticket counter has sharp corners that could hurt persons with limited vision.	• Ensure that the ticket counter is about 800 mm high, ideally with knee space for a wheelchair user, measuring approx. 500 mm deep and 900 mm wide, with 1200 mm clear space in front. • A second row of holes in the ticket booth glass closer to the counter would enable wheelchair users, shorter people and children to communicate better with the attendant. • Ensure the ticket booth glass is not reflective so that passengers can see the ticket booth agent's lip movements clearly. Lighting inside the ticket booth that illuminates the agent's face would help as well. • Consider installing an induction loop or intercom system. • Consider rounding the corners of the counter and providing colour contrast along the edge/corner.	• High • Medium • Consider • Consider • Consider

4. Fare Gates **i. Passageway width**	• Wheelchair users require passageways at least as wide as their wheelchairs in order to pass.	• The passageway next to the fare counter is around 975mm.	• Passageway width next to the ticket booth is 1000mm.	• Ensure a minimum clear passageway width (excluding doors) of 900mm beside the ticket booth.	• High
ii. Fare gate configuration	• If passengers can enter/exit from only one end of the station, proper signage is required. • Turnstiles are not suitable for people with wheelchairs and flap gates are recommended.	• Some stations have turnstiles and some have flap gates.	• There is atleast one flap gate at each station.	• Provide at least one entry and exit flap gate per station entrance. • Allow persons with wheelchairs or blind persons through the door so that they have a direct route to the platform to enter or exit through the door.	• High • High
iii. Width of turnstiles / fare gates	• Width of turnstile/ fare gates should be able to accommodate wheelchair users. • Wheel chair users should be made to turn as little as possible at entrances and exits.	• There is an entry and exit on each side and a direct path manned by a station attendant. All are 975mm wide. • However, from the entrance to the fare gate, persons with wheelchairs have to turn thrice – around the fare counter and onto the platforms within a very short distance. • The tactile guideways only go through the exit gates. There are no guideways at entrances.	• There is an entry and exit flap gate on each side, all are 900mm wide. • However, from the entrance to the fare gate, persons with wheelchairs have to turn thrice – around the fare counter and onto the platforms within a very short distance.	• Ensure a direct path of at least 900 mm clear width as far as possible for people with limited vision and mobility. • The station attendant can man the door. The tactile guideways should be planned accordingly	• High • Medium
5. Floor surface	• A slippery floor will hurt all passengers.	• The platform is in slate stone.	• Drawings indicate polished Kota stone flooring.	• Use appropriate anti-slip flooring material that is effective even when wet, especially along the ramps.	• High

6. Seats and supports	• Absence of supports makes it difficult for old persons to move, sit down or get up. • People with impaired vision are better able to identify objects with high visual contrast.	• There are no handrails in the platform area or close to the sitting areas. • The benches and the floor are well contrasted.	• There are handrails in the platform area or close to the sitting areas.	• Provide continuous handrails on both sides of the platform and hand supports close to sitting areas. Ensure that the top of the handrail is 865-965mm above the floor. • Consider improving visual contrast between edge/corner of benches and station walls/floor through material selection. Dark wooden benches against a lighter floor could be suitable.	• High • Consider
7. Sliding doors	• There might be a possible pinch hazard if the doors slide inside.	• The doors open externally.	• The doors slide inside the station walls, creating a possible hazard for passengers sitting or standing next to doors.	• They should open outside the external walls.	• High
8. Visual elements **i. Lighting**	All persons, especially people with limited vision and women benefit from sufficient lighting in and around stations.	• Lighting in the station is sufficient at night.	• Provision for Lighting in the station is sufficient.	• Ensure adequate lighting inside and around accesses to the station, especially at night.	• High
ii. Colour contrast	• All passengers, especially the visually impaired would benefit from a visual warning at the edge of the platform, platform-bus gap and to distinguish key obstructions.	• Currently the railings, turnstiles and fare gates are all in stainless steel. • The seating is dark brown and in high contrast to the floor.	• Colour scheme yet to be determined.	• Consider colour contrast for railings, fare gates and ticket counter edges. A “safety colour” could be used.	• Consider
iii. Signage	• Placing Route maps effectively can improve the movement in and around the station. Poor placement of maps can obstruct movement of passengers. • LED signs displaying	• Currently there are route maps before the ticket booth and above the turnstiles inside the station, causing potential obstruction in movement. • Currently there is LED dynamic signage at both	• Signage to be displayed at the bottom of the ramp/stairs. This is a good location for a BRT system map, since it would allow passengers to view the map before entering the station. • Map/information displays	• Consider placing BRT route map, fare details and other transit information at the bottom of the ramp before entering the station. • Inside the paid area, consider displaying static route maps, showing the sequence of stations, perhaps above the bus boarding doors. These	• Consider • Consider

	dynamic passenger information are useful to all passengers, so long as the text is large enough to be read at a distance. • Passengers with disabilities, especially wheelchair users, would benefit from being directed to the most accessible station entrance.	ends of the station informing passengers of the upcoming bus. Dynamic signage absent on the ramps. • There is a wheelchair icon above the ticket booth to identify the accessible entrance to passengers. • There is a wheelchair icon inside above the turnstiles.	inside the station are yet to be determined.	maps are also useful in the buses. • Ensure that messages displayed on the LED signs can be read from farthest points: bottom of the access ramp and opposite end of the station's paid area. Alternatively, a double-side LED display could be mounted above the middle of the station paid area. • Consider including a wheelchair icon in the bus shelter name sign at the ramped station entrance to identify the accessible entrance to approaching passengers. • Consider using a wheelchair icon inside the station, on an overhead sign to direct alighting passengers towards the accessible exit.	• Medium • Medium • Medium
9. Audible Elements **i. Warning sounds**	• Particularly affects people with limited visibility as they may not know when the doors will close and potentially hurt themselves.	• Currently there are no audible warnings to announce the opening and closing of sliding doors.	• Currently there is no provision of audio announcements for the opening and closing of sliding doors.	• Consider audible warnings to announce the opening and closing of sliding doors	• Consider
ii. Transit information	• Particularly affects people with limited visibility as they would have to rely on others to know where the buses will dock.	• Currently, there are no announcements to inform about service delays or where the buses will dock.	• Currently, there is no provision for announcements to inform about service delays or where the buses will dock.	• Consider installing a public announcement system and speakers in the station platform area.	• Consider
10. Tactile Elements **i. Tactile Information**	• Warning tiles indicate the edge of the station platform to blind and visually impaired	• Warning tiles in yellow colour provide a high contrast for visually impaired passengers.	• Currently, there is no provision for tactile/ high contrast warning strips.	• Ensure high contrast tactile warning strips to mark transition between sidewalks and traffic lanes, bus ways, station entrances and bottom or top of	• High

	passengers. Warning tiles in a contrasting colour would benefit all users. • Slim tactile warning strips can be easily missed. • Tactile warning strips that extend all the way to the sliding doors could harm blind persons. • Additional Braille signage could assist blind persons in independent movement.	• They are currently 300mm wide and could be easily missed. • The tactile warning strips extend right up to the sliding doors. • Currently there is no Braille signage at stations to inform blind people.	• There is no provision for Braille signage at stations.	ramps or stairs. • Consider tactile warning strips of at least 560-600mm depth. • Ensure the tactile warning strips end about 600-1000mm from the sliding doors. • Ensure braille signage is installed preferably at all stations or at key stations for blind people.	• Consider • High • High
11. Platform to Bus Floor Gap	• This poses a hazard for persons in wheelchairs.	• Currently the platform-bus gap is more than 100mm.	• Yet to be determined.	• Ensure that horizontal gap is not more than 100mm. Vertical gaps should be minimized as much as possible to no more than 1-2 cm. The platform-to-vehicle gap can be minimized by a combination of station and vehicle design, driver training, and ongoing vehicle and platform maintenance.	• High

2. Access along trunk line and feeder line corridors

Component	Impact on Accessibility	Janmarg Stations	Indore Stations	Possible solutions	Priority
1. Sidewalk and Paths **i. Surface condition**	• The absence of poor sidewalks can directly limit the accessibility of people with disabilities.	• The current sidewalk widths vary significantly and are not planned for people with limited vision and mobility.	• Sidewalk design widths vary significantly and are not planned for people with limited vision and mobility.	• Ensure that minimum walking space is provided depending on the existing context and pedestrian volumes. However, ensure that it is not less than 1500mm, with minimum 900 mm for passing an obstruction such as a signpost. • Ensure that pedestrian pathways should be even and smooth with non-skid surfaces. • Ensure that the maximum side-slope ideally of 1 to 2% and not more than 2.5% • Ensure that obstacles such as street furniture contrast with their surroundings and be off to the side to permit a straight and clear pathway for all pedestrians. Ideally, a grass strip between sidewalk and curb can separate the sidewalk from a BRT corridor, providing further safety for all and especially for blind or visually impaired pedestrians.	• High
ii. Tactile Guideways	• The presence of tactile guideways can improve navigation to the stations for people with limited vision.	• Currently, tactile guideways begin only at the access ramps.	• There is no provision for tactile guideways on sidewalks.	• Ensure that the tactile guideways mark a travel path along a sidewalk, from a sidewalk across a pedestrian crossing to a BRT station. Care should be taken that tactile guideways do not lead into obstacles or safety hazards.	• High

				• Ensure that tactile guideways are at least 300 mm wide. • Ensure that the guideways are consistent and in a contrasting colour and texture to their surroundings.	
2. Intersections and crossings **i. Curb Ramps**	• Curb ramps benefit all users and particularly wheelchair users.	• Currently there is no intersection design to ensure that people with limited mobility or vision can safely cross an intersection or road to the BRT corridor.	• The width of the curb is not indicated.	• Indicate access to adjacent sidewalk. Consider raised pedestrian crossings. • Or else, ensure curb ramps such that they do not exceed a maximum gradient of 1:12 slope. A gradient of 1:20 is preferred and a 1:20 gradient should be the maximum slope of adjoining gutters and road surfaces. • Ensure curb ramps have a tactile warning strip, aligned with the curb ramp on the opposite side of the intersection. • Ensure curb ramps lay within the marked pedestrian crossing. Whenever possible, it is best practice that curb ramps should be the same width as the pedestrian crossing. • Ensure curb ramp is not less than 1200 mm wide.	• High
ii. Pedestrian Crossings	• Pedestrian crossing signals, including audible announcements benefit all users. • Refuge areas provide a safe island for all	• There are zebra crossings but are not enforced. • Currently there is no refuge area for passengers	• Crossing provisions are not yet determined. • Drawings don't show sidewalks but do suggest a	• Consider raised crossings across lightly used roads, non-signalized intersections leading into larger corridors. • Ensure a refuge area of minimum 1500mm length and 1200mm	• High • High

	passengers while crossing the road.	while crossing road from the bus way, thus exposing them to traffic.	refuge area separating BRT lane from mixed traffic.	width between the bus way and the mixed traffic lane where people can wait.	
iii. Bollards	• Where bollards are used, adequate space should be provided for wheelchair users to pass between bollards.	• Bollards and curbs restrict access for wheelchair users and are unsafe for blind persons.	• Drawings suggest bollards along refuge area, but do not indicate distance between them. • Railing is designed to prevent two-wheelers from crossing.	• Consider removing bollards, since there is a railing to prevent two-wheeler access.	• Consider
3. Signals **i. Traffic Signals**	• Crossing times are often based on a pedestrian speed of 1.2 m/sec on level ground, but elderly or frail persons may need time to cross at 0.9 m/sec.	• Currently there are no provisions in the signal systems to aid people with limited vision and mobility.	• Traffic signalling is yet to be determined.	• Ensure there are “count down” traffic lights, which indicate the seconds remaining to cross. These assist pedestrians to know whether it is safe to cross and to avoid a need to rush when, in fact, adequate time is available.	• High
ii. Audio Signals	• Audible signals at pedestrian intersections can especially assist passengers who are sight-impaired.	• Currently there are no provisions in the signal systems to aid people with limited vision and mobility.	• Traffic signalling is yet to be determined.	• Consider installing audio signals. Locations can be user-activated by uniformly located push buttons. When a push button is used, the source of the sound should be at the push button mechanism located approx. 1,100 mm above ground level. • Ensure push buttons are uniformly located as close as possible to the pedestrian crossing. When buttons are used at two crosswalks at an intersection, they should be located at least 3 meters apart to avoid confusion.	• Medium

DISCUSSION

In both cities of Ahmedabad and Indore, the BRT stations are far more accessible to people with visual and physical disabilities in comparison with other public transport systems not only in their own cities, but also other cities in the country. In the case of Janmarg in Ahmedabad, the designers specifically consulted with the Blind Peoples' Association to make the stations more accessible. Further, they are currently conducting experimental trials with rollers at the edge of the Phase II stations to reduce the platform bus gap and avoid buses from being damaged.

It is well understood now that active consultation with PWD groups during the planning and design stage is far more cost effective in making new infrastructure accessible to all than "retrofitting" it later on. During the planning stage, sufficient emphasis needs to be laid on system wide consistency so that PWD can predict and use public infrastructure more easily. For example, blind people break their trip into multiple destinations based on the number of steps. Having the same number of steps between urban nodes would significantly aid them in navigating not only BRT stations, but also city streets and other modes of public transport. Further, serious attention must be paid to finer details like handrail design, surface levels, contrasting colours, wheelchair movement, etc. for these can severely restrict or enhance accessibility for PWD.

With no specific agency or department responsible for ensuring universal accessibility in the urban context, the inclusion and supervision of universal design features in any new infrastructure project often gets compromised. There are no specific enforcement provisions, incentives or disincentives for authorities to be proactive in undertaking universal accessibility as an infrastructure criterion under any legislation.

In general, there is indifference within the planning ecosystem – bureaucrats, architects, planners, contractors, project managers – towards universal accessibility in urban infrastructure. Often, it is considered 'additional' instead of 'integral' to any urban system, requiring attention only in unusual conditions. Thus, universal accessibility features are the first to be sacrificed when reducing infrastructure expenditure, despite high costs of mega urban projects.

CONCLUSION

Three-quarters of the inclusive design features of BRT provide at least some benefit to all passengers while only 11 percent of such features exclusively serve passengers with mobility, sensory or cognitive disabilities. [World Bank, 2010] Some of the low-cost improvements can generate disproportionate returns not only to the disabled community, but to society as a whole.

The improvement in accessibility for disabled people is a long run agenda, but several recommendations must be considered immediately. The New Improved JNNURM creates a unique opportunity for pushing much of the recommendations / reforms to build inclusivity in our urban services. With around 44% of 39.2 trillion estimated for transport infrastructure, there is an immense opportunity to channelize these investments to making the urban road, street and transport infrastructure inclusive. It is widely acknowledged that it is lesser expensive to provide “access for all” features in the original design of new infrastructure, as opposed to “retrofitting” the infrastructure later on. As a priority, the key areas within a city could be identified to target improvements. These could include major commute corridors which would serve the highest volume of passengers or local neighbourhoods feeding the corridors.

The Ministry of Social Justice and Empowerment (MoSJE) in collaboration with Commissioner’s offices, the Ministry of Urban Development and Employment, and the states could also work towards benchmarking minimum national standards for accessibility and participation processes (consultations, monitoring, access audits) to which authorities could be held accountable. Additional university and in-service training courses for architects, engineers and planners would expose them to principles and practices of universal design and accessibility. Financing for designated centres of excellence in this area could also be made available. [World Bank, 2007]

While NIJNNURM creates an immediate opportunity for an infrastructure overhaul, a longer sustained process towards creating awareness and building capacity of the ecosystem needs to be set in place. This multi-pronged effort sustained by the large national and local investments would go a long way in developing a nation that records not only impressive economic growth but also is inclusive of larger and diverse populations.

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[i] Jawaharlal Nehru Urban Renewal Mission is a seven year initiative by the Central Government of India to modernize 65 selected cities, using an overall investment of $20 billion, starting from December 2006.