MOBILITY FOR ALL: THE RIGHTS PERSPECTIVE

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INTRODUCTION

Over the past decade, Delhi's public transit infrastructure has grown exponentially to cater to its burgeoning population. Since the scale of development was unprecedented, the opportunity to serve the widest demographic possible, including the elderly and disabled, was emphasized. To create inclusive transit services that could be sustained and replicated across the country, equitably access for all was considered crucial.

APPROACH

Samarthyam, National Centre for Accessible Environments, a civil society organization in India, advocated for the incorporation of universal accessibility features in the National Urban Transport Policy revision in 2014. It continues to collaborate with Government of Delhi and other public transit agencies to identify mobility challenges and provide innovative solutions for persons with reduced mobility and disabilities.

Delhi Metro Rail Corporation (DMRC)

DMRC set an example by including the access needs of persons with disabilities (PwDs). Metro stations include accessible ramps with hand rails; guiding paths and warning strips; bright colour contrast, large lettering signage and information displays; lift controls at low height with Braille panels, raised controls and auditory signals; and, resting areas. Platforms are designed for level boarding into the rail coach, with strategically placed warning tiles and wayfinding signage. Inside the coaches are designated wheelchair spaces, audio announcements, dynamic displays and sensory door closing mechanisms. There are designated parking lots for PwDs outside.

Bus Rapid Transit System (BRTS)

Low Floor Buses: To create an accessible bus, Samarthyam in association with Transport Research & Injury Prevention Programme (TRIPP), Indian Institute of Technology (IIT) Delhi, worked with the bus manufacturer, TATA Motors, to incorporate wide doors, transit ramps, designated wheelchair space, public information systems with audio & digital display, colour contrast handrails and stanchions, and, illuminated destination and route signs.

Bus-Queue-Shelters (BQS)

Samarthyam intervened at the planning stage to emphasize the need for platform-bus interface for level boarding; BQS with ramps, tactile paving, Braille route and information signage. Ramps with handrails and configuration of tactile paving were worked out with BRT architects during the implementation process.

Pedestrian Infrastructure

To provide accessible 'last mile connectivity' between the transit facilities, and to other services, Samarthyam revised the pedestrian guidelines and codes of the Indian Roads Congress with inclusive design standards for pedestrians and commuters.

RESULTS

As the capital, Delhi has set an example for the rest of the country with its inclusive transit infrastructure with the Delhi Metro, low floor buses and bus-queue-shelters, and pedestrian facilities. From the inception, accessible features were incorporated in the planning and implementation of these services, with continued review and adaptation underway.

CONCLUSION

Adoption of universal design in perspective planning of facilities involving both stakeholders and user groups promotes independent travel, sustainable mobility and makes the trip chain seamless. The more accessible the urban transit infrastructure, the more it is used. The more it is used, the greater the societal pressure on the responsible civic agencies to incorporate further inclusive features. It is also in line with the new Rights of Persons with Disability Act, 2016.

KEYWORDS

obility, Safety, pedestrian friendly, barriers, universal design, disabilities, accessibility

INTRODUCTION

Every individual, including Person with Disabilities (PwDs), has the right to travel and to use public transportation with dignity and independence. It is a fundamental right of all citizens regardless of their abilities and disabilities, since travel is usually a daily necessity for education, employment, medical attention, and entertainment.

Obstacles in existing transportation systems i.e. vehicles, terminals, and operations induce fatigue, restricteducational and employment opportunities thus causing frustration. It hinders the right to freedom of movement, equal participation and access to health and other social services.

Samarthyam, National Centre for Accessible Environments, a civil society organization in India, advocated for the incorporation of universal accessibility features in the National Urban Transport Policy revision in 2014. It continues to collaborate with Government of Delhi and other public transit agencies to identify mobility challenges and provide innovative solutions for persons with reduced mobility and disabilities.The best example is Delhi Metro Rail Corporation (DMRC), a joint venture of Government of India and Government of National Capital Territory of Delhi serving Delhi, Gurgaon and Noida of India. The developments and the initiatives/policies etc. undertaken are keenly followed by the rest of the country.

DELHI METRO RAIL CORPORATION

To its credit, the Delhi Metro from its inception wholeheartedly embraced the need of access for PwDs. Samarthyam, a civil society organization promoting universal access in the Asia Pacific region, began advocating for the access needs of PwDs from the early stages of the project. Samarthyam approached DMRC with the objective of ensuring that the design of all the stations is in consonance with the diverse access needs of PwDs. It conducted the first Access Audit (accessibility check) during the under construction Seelampur station (renamed Welcome station) in March 2002 along with DMRC engineers & architect. The access audit team comprising people with diverse disabilities and used accessibility checklist and submitted its suggestions and recommendations supplemented with photographs to DMRC for implementation.

Sensitization workshops for policymakers and stakeholders were also conducted during this time.

FIGURE 1 Access Audit of Metro

FIGURE 2 Workshop for Stakeholders

DMRC welcomes the user group perspective and invited Samarthyam for access audits and inputs on other metro stations/services from time to time. The media highlighted the cooperation and coordination between Samarthyam and DMRC for barrier free Delhi Metro, playing a role in promoting its accessibility. The first stretch of 8.3km with four Coaches and six Stations were inaugurated on 24th December 2002.

FIGURE 3 Inaugural Delhi Metro ride on 25th December 2002

The DMRC has set an example for Universal and Inclusive Design in India. The built Stations provide features such as designated parking for PwDs; ramps with hand rails; guiding paths and warning strips for vision impaired persons; bright colour contrast for low vision persons; large lettering and information displays and signage; lifts with lowered control panel with Braille and raised control buttons and auditory signals, wide doors and grip rails on the sidewalls of the elevator car; resting areas for senior citizens and disabled persons; well-lit corridors; and, widened ticket gate to accommodate wheelchair users. Inside the coaches, there are designated spaces for wheelchair users, audio announcement with dynamic display and sensory door closing mechanisms.

FIGURE 4 Ramp Access to Station

FIGURE 5 Colour contrast Signage Overhead

FIGURE 6 Way finding Overhead Signage

FIGURE 7 Directional Signage

Also, Metro Sahayaks (or Metro Helpers) are present at stations to provide assistance at all times. They are invaluable not only for PwDs, but also for senior citizens, new users and others unfamiliar with the system.

DMRC is committed to making the Metro system accessible in its growth plan and was always receptive to constructive feedback, regularly conducting access audits at most stations opened since to make them user-friendly and safe. Samarthyam later provided inputs for further improvements which included the following: lowering the ticket counter height/single window facility; distinct sound beeper for orienting vision impaired persons; and transit ramp to bridge horizontal and vertical gap between the coach and platform. The toilets constructed by a private agency for PwDs required modifications in its design. Samarthyam forwarded the design of an accessible toilet to DMRC and the private agency. The Chief Architect, DMRC is following up on all suggestions.

Impact of Delhi Metro

Examples from the Delhi Metro validate this paradigm shift, represented by the diversity of users of this public transportation system. It has demonstrated how an accessible system creates safe, comfortable and equitable infrastructure, not only for PwDs, but also those with reduced

mobility, people with health problems for example respiratory, cardio-vascular, joint problems or temporary ailments; senior citizens; pregnant women; families with young children and people with heavy luggage etc.

Accessibility, comfort, safety and time-saving were ranked the main reasons for this shift.

Purpose

To provide and promote accessibility in urban transit systems, an invaluable tool is user feedback. While interventions for inclusive design have seen specific changes in existing systems, DMRC was the first system in India to be designed with a holistic approach towards universal accessibility. This comprehensive planning approach translated into the accessible trains, stations, services and facilities. Buttressed by its educated and enabling support staff, the empowerment it provides not just in terms of access but in attitude, acceptance and understanding highlights the crucial role accessibility can play in society.

FIGURE 8 Widened Ticket Gate

FIGURE 9 Designated Space for Wheelchair

Accessible and equitable connectivity that the Delhi Metro provides has shifted the design paradigm of public transportation infrastructure towards creating accessible systems and services. As a model system, it is being studied for replication in other cities across India including Chennai, Hyderabad, Bangalore and Kochi, among others. As a working system, its challenges and success are being highlighted, the drawbacks and limitations worked upon for better accessibility. The biggest success is that the rationale for access is no longer required for public agencies, it is now a given. It is no longer a question of why or how much, but how do we do it best. This is a measure of the success of the Metro, the impact of advocacy and awareness and also the promotion and implementation of the UNCRPD.

The DMRC too has been consequently looking to improve shortfalls in accessibility in future phases of the Delhi Metro, studying the deficiencies and user experiences to create a better system.

BUS RAPID TRANSIT (BRT) SYSTEMS

BRTsystems have emerged as the primary mode of public transport under consideration. They are comparatively flexible, easy to adopt, easily upgradable and affordable. In 2002, Government of National Capital Territory of Delhi (GNCTD) approved BRT on 7 dedicated corridors totalling 115.5 km, as the answer to Delhi's traffic woes. BRT systems not only provide a

dedicated corridor for quicker bus & priority vehicle movement, but also provide a segregated and safe corridor for pedestrians and non-motorized transport (NMT) like cycles and cycle rickshaws. This allocates road space on a more equitable basis with people rather than vehicles as the focus - the weakest and most vulnerable road users have parity with private vehicular Right of Way users. The system facilitates access to public transport and also encouragespedestrian trips for short distances.

Towards the prioritization of public transports particularly BRT systems, stakeholders are required to invest in renewal of transit and road infrastructure. This creates ample opportunities to make the system inclusive by incorporating Universal Design features. This should include a full spectrum of inclusive design features, most of which are cost effective when included in new vehicles. For example, buses should be built to minimize the horizontal and vertical gaps between the station, platform edge and the bus floor. [Rickert, 2007]

Delhi is a prime example of the multiplicity of advisory, regulating and implementing authorities responsible for the BRT. Samarthyam partnered with a number of stakeholders and service providers to identify transportation challenges and solutions for persons with reduced mobility and disabilities, which affect travel behavior and frequency for this system.

Methodology

Samarthyam approached the Transport Research & Injury Prevention Programme, Indian Institute of Technology Delhi (TRIPP, IITD), who were engaged as technical and conceptual advisors to BRT Delhi by the Transport Department, GNCTD. Samarthyam's request to be part of the BRT Delhi project, to highlight concerns of persons with disabilities (PwDs) and to promote 'Mobility for All', was welcomed by TRIPP, IITD.

Defining Accessibility

Since 2003, periodic meetings of the working group have been conducted by TRIPP, IITD; attended by major stakeholders, transport and urban planners, bus manufacturers, architect firm, opinion makers and other implementing agencies. The meetings offered a platform to all stakeholders to interact with professionals involved in designing and managing BRT around the world. Samarthyam has advocated the moral, legal and commercial advantages of having accessible BRT in all the meetings and forums. These meetings helped keep the focus on inclusion in planning and design, monitoring compliance with standards and avoiding costly mistakes. [TRIPP, IITD. 2003]

Important elements of the BRT system such as buses, bus shelters, street and pedestrian infrastructure were targeted to have Universal Design features, thereby ensuring a seamless journey from the point of origin to destination.

Low Floor Bus (LFB)

Samarthyam made a presentation on the concept of Universal Design in public transit systems in December 2005, at "Workshop on BRT System Delhi", organized by Transport Department, GNCTD and attended by stake holders and vehicle manufacturers from India. Three international experts from USA, Austria and Canada presented best practices on BRTS from all over the world. [TRIPP, IITD. 2005]

Consequently, design and prototype development for high capacity low floor buses were undertaken by bus manufacturers in India including TATA Motors Limited, Ashok Leyland

Limited and Sutlej Motors Limited. Except TATA Motors, the prototypes of all other manufacturers were semi low floor buses with steps.

A comparative analysis (Table 1) of the high floor, semi low floor and low floor bus, tilts the balance in favour of LFB. Moreover, it has been proven in countries already using the BRT that LFB are more popular among users. Their attractiveness derives from their strategic design and development intent to enhance the appeal of bus travel as a transport mode, not just to facilitate access for PwDs but for the entire society. [Agarwal & Sachdeva, 2005]

TABLE 1 Comparative analysis of high floor, semi low floor and low floor bus

Features	High Floor Bus	Semi Low Floor	Low Floor Bus
Floor height	850mm-1050mm	650mm	390mm
Door width	750mm-790mm	1000-1200mm	1200mm-1500mm
Boarding & alighting	More time is required	More time is required	Easy and speedy boarding and alighting
Accessibility	Inaccessible for wheel chair and other mobility aid users	Inaccessible for wheel chair and other mobility aid users	Accessible and safe for all users

Tata Motors Limited supplied 6 prototypes LFB to Delhi Transport Corporation (DTC) for trials on Delhi roads in November 2005. One of the prototypes LFB was access audited by Samarthyam and ERC Design, Tata Motors Limited (Fig. 10).

FIGURE 10 Access audit of prototype bus by Samarthyam and ERC Design team

All access features provided by Samarthyamhave now been provided in the first 1100 buses delivered to DTC. These buses are plying on all Delhi routes. LFB will gradually replace high chassis buses in DTC's fleet. [Sachdeva and Agarwal, 2007]

BUS-QUEUE-SHELTERS (BQS)

BQS is an important component of the BRT. The greatest challenge is to provide platform- bus interface so as to facilitate level boarding. Samarthyam conducted a preliminary field study along with TRIPP, IITD to check feasibility of reducing vertical and horizontal gaps during docking by LFB. It was found that:

- It is possible to synchronize the platform height with LFB floor height to achieve virtually level access (Fig. 11).

FIGURE 11 LFB floor heights synchronized with the platform height to achieve level access

Hinged manual ramp in the LFB can be deployed to bridge the horizontal gap and the wheelchair and pram users can easily board/de-board.

- This would help everyone including: persons with reduced mobility like senior citizens, families with young children, pregnant women, people with temporary ailments, people with heavy luggage and persons with diverse disabilities.

BQS has been designed taking safety aspects into consideration. Waiting passengers are not exposed to vehicular traffic. Other features in the BQS such as ramps, tactile paving, Braille route and information signage were also considered to make it completely accessible. Samarthyam and S. G. Architects, consultants to BRT Delhi, worked on accessible design standards (Fig. 12) such as:

- ramps with 1:20 gradient,
- handrails at two heights (for children and adults),
- engineering configuration of tactile paving for persons with vision impairment and
- route signs & information in Braille and digital display system.

FIGURE 12 Accessible design standards at BRT BQS

Pedestrian infrastructure

Transport disadvantaged persons such as persons with reduced mobility and PwDs constitute a group with the largest, hidden, unsatisfied demand for user friendly public transport systems. Any BRT system cannot be called completely accessible, if the street and pedestrian infrastructure along the corridors providing access to and from the BQS is not inclusive.

BRT Delhi has set an example of inclusive design and transit oriented development through meticulous planning of pedestrian's access needs. Following measures were planned and undertaken during the re-development of entire Right of Way:

- Reconstruction of pedestrian path, service road and medians
- Widening of corridor cross section for eliminating congestion points
- Leveled and continuous footpaths having resting spaces and spaces for hawkers at every 200m
- Continuous tactile pavers along entire 5.8km length for persons with vision impairments (Fig. 13)
- Raised Table Top for traffic calming and at grade crossing for pedestrians and mobility aid users
- Bicyclist/ tricyclist tracks and designated parking for auto rickshaws
- Way finding and route information signage in contrast colour and large fonts
- Special white lighting at average 40 lux for footpaths allow the colour contrast of the tactile pavers to be visible during the day and night
- Crossings and intersections- auditory signals and accessible median refuges

FIGURE 13 Continuous tactile pavers on entire 5.8km BRT corridor

BRT is the most cost effective environmental friendly solution for public transportation in the Indian context. Offering 'Mobility for All' in BRT System, is the first big step towards inclusion and improved quality of life in cities.

BRT Delhi is the result of partnership between the users & stakeholders and people-focused approach incorporated into transport planning. Adoption of Universal Design in perspective planning of facilities involving both stakeholders and user groups promotes independent travel and sustainable mobility, not just to persons with disabilities, but also to trans-generational passengers.

PEDESTRIAN INFRASTRUCTURE

A comprehensive design approach, implementation, monitoring and consistent communication on universal accessibility in the street, road and pedestrian environment and access to and use of public transport infrastructure are essential for all users to optimize their level of independence and live life with dignity. The link between lack of access and exclusion is obvious. For example, the right to employment or accessing livelihood opportunities becomes meaningless in the absence of an accessible, safe and user-friendly walking environment and transit infrastructure.

To provide accessible 'last mile connectivity' between the transit facilities, and to other services, Samarthyam revised the pedestrian guidelines and authored the Universal Accessibility Manual for Urban Roads and Streets of the Indian Roads Congress.

These guidelines and codes aim to fill the knowledge gap about universal access and act as a guide for practitioners, city officials and authorities to plan, design pedestrian environment and sustainable transportation.

CONCLUSION

Today, there is an increased sensitivity and enhanced understanding amongst Government agencies, private sector, NGOs and other stakeholders of the need for accessible transportation. Inclusive and Universal Design would result in more passenger inflow, less travel time and added revenue generation for the service providers. Its reliability, affordability and comfort would attract people using private modes of transportation. It would also result in increased education and employment opportunities and the integration of PwDs into mainstream society.

Samarthyam on the basis of its experience believes that it is an equal responsibility of PwDs (user group) to advocate/articulate the need for accessible public transportation, to the concerned departments/stakeholders. Cooperation, coordination and constructive approach between the user groups and the implementing agencies during the policy formulation and execution, is the best approach in achieving the desired objective of "Mobility for All".

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