

## A study on mobility problem of disabled people in Dhaka city

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**ABSTRACT:** People with disabilities constitute a significant proportion of the poor in developing countries. Poverty, discrimination and isolation are widespread that people with disabilities continue to face. Movement accessibility is an important enabler of strategies to fight poverty through enhancing access to education, employment, and social services. Three main types of barriers were identified from the focus groups namely Social barriers, Psychological barriers and Structural barriers to accessibility. The focus of this particular study has been restrained to the structural barriers. The primary objectives are considered to find the accessibility problem for all types of disabled people and accessibility deficiencies of places they visit frequently. For this particular research the basics are three terms: disability, accessibility and movement. With distinct processes and careful observations, a picture of accessibility provisions and deficiencies at some selected places are drawn. The output of this study is mainly to focus current mobility barriers of disabled people in Dhaka city.

### 1 INTRODUCTION

In developing countries like Bangladesh disabled people faces ignorance due to poor economic condition. Moreover, exclusion and social hindrance increases the costs associated with disability to constrain disabled people from breaking out of poverty. In reducing poverty improved access and mobility are considered as most important factors. These can also facilitate the participation of disabled people in economic and social processes. Many countries have legislation requiring that these challenges be addressed but effective responses are generally very limited. Action to improve the situation is constrained by the serious shortage of data on the access and mobility needs of disabled and elderly people as well as by resource constraints.

Disabled people are part of our society. For a civilized nation there is no chance for denying the right of them. In order to uphold the rights and dignity of persons with disability, integrate their full participation in national and social activities ensuring their overall welfare and other relevant issues pertaining to them, the Government of Bangladesh enacted “Bangladesh Disability Act-2001”. And RAJUK (Capital Development Authority of Bangladesh) has issued an amendment to its “Dhaka Building Construction Act 2008” incorporating the accessible design aspects for buildings.

An important reason given for the lack of effectiveness of access policies and legislation is the lack of resources for implementation. Governments often find it difficult to allocate funding for this in the face of pressure to meet other priorities. The private sector may not have sufficient incentives to implement provisions for people with disabilities. In most cases, applying Western disability standards and facilities to deliver access solutions and ensure universal access is not affordable or realistic for the provider or for the users in low-income countries - as most of them are too poor to pay the costs of such standards. That is why a comprehensive research is needed to be conducted for deciding compatible and effective solution of accessibility for a low-income country like Bangladesh.

For ensuring accessibility which allows disabled people to move independently an integrated system is needed. It means the uniformity and continuity is mandatory for an accessible environment for disabled people. That is why for ensuring full benefit of accessibility for the disabled people accessible helping features must be installed every location they visit or use. The technical improvement of accessibility features is not sufficient for ensuring accessibility for disabled people. Educational improvement and social awareness play important role for working technical improvement effectively.

## 2 OBJECTIVES

The main purpose of this research work is to provide valuable information on effective engineering techniques for ensuring accessibility for disabled and elderly people. To fulfill this purpose intensive concentration was given throughout the study to achieve the following specific objectives:

- To identify problem of movement and access deficiencies for handicapped people
- To observe facilities and deficiencies of available accessibility for disabled people in both indoors and outdoors
- To explore some low cost and easily implementable access aiding features for disabled people

## 3 DISABILITY AND ACCESSIBILITY

### 3.1 *Disability and types of disability*

According to World Health Organization, disability is an umbrella term, covering impairments, activity limitations, and participation restrictions. Impairment is a problem in body function or structure; an activity limitation is a difficulty encountered by an individual in executing a task or action; while a participation restriction is a problem experienced by an individual in involvement in life situations. A disability may be physical, cognitive, sensory, emotional and developmental or some combination of these. Besides these two more types of people are to be considered for installing mobility aiding features. They are older adults and children because of inability to quickly avoid dangerous situations, impaired judgment, confidence, and decision-making abilities. Table 1 is presented to demonstrate the types of disability which are considered for design and installment of mobility aiding features.

Table1. Basic types of disabilities considered for access aiding features

Types of disability	Description
Non-Ambulatory	Impairments that, regardless of cause or manifestation, for all practical purposes, confine individuals to Wheel Chairs
Semi-Ambulatory	Impairments that cause individuals to walk with difficulty or insecurity. Individuals using braces or crutches, amputees, arthritis, spastics, ladies with advanced pregnancy and those with pulmonary and cardiac ills may be semi-ambulatory
Sight	Total blindness or partial impairments affecting sight to the extent that the individual functioning in public areas is insecure or exposed to danger
Hearing	Deafness or hearing handicaps that might make an individual insecure in public because he is unable to communicate or hear warning signals

### 3.2 *Extent of disabled people in Bangladesh*

Handicap international (HI) and National Forum of Organizations Working with the Disabled (NFOWD) and the Unnayan Onneshan with support from Department for International Development (DFID) initiated a study to determine the national prevalence rate of disability. The final report was published in year 2005 which describe a complete statistics of the disabled people in Bangladesh.

According to the report, among the persons with disabilities, the percentage share of different types of impairments is described in Figure 1. It has been found from Figure 1 that 5.6% people in Bangladesh have a disability of one kind or another. It is also be found that only 4% of disabled people have impairment of speaking who face less problem of accessibility (Rashed Al Mahmud Titumir, February 2005). Photograph 1 shows a crosssection of disabled people in Dhaka city.

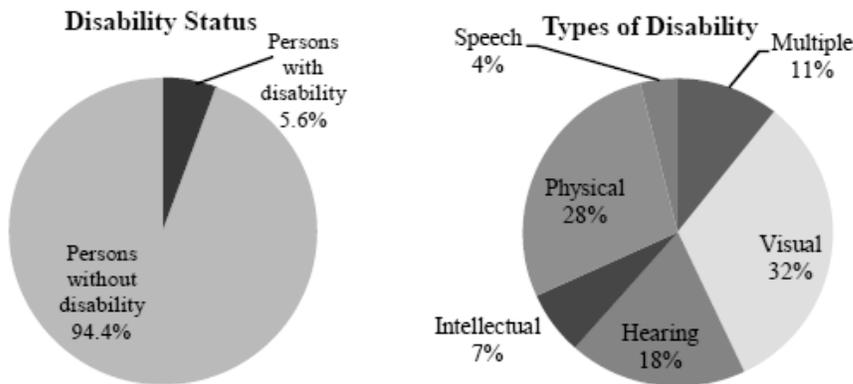


Figure 1. Percentage distribution of population by disability stats and types  
 \*source: Titumir & Hossain, February 2005



Photograph 1. Snapshots of disable road users in Dhaka City

### 3.3 Accessibility and universal design

Definition of accessibility (or just access) refers to the ability to reach desired goods, services, activities and destinations (collectively called opportunities). Access is the ultimate goal of most transportation, except a small portion of travel in which movement is an end in itself (jogging, horseback riding, pleasure drives), with no destination. This perspective assumes that there may be many ways of improving transportation, including improved mobility, improved land use accessibility (which reduce the distance between destinations), or improved mobility substitutes such as telecommunications or delivery services. Considering disabilities and accessibility issue following features can be considered as scope of accessibility in transportation:

In building:

- Entrance
- Doors
- Elevators
- Stair
- Corridor or walking passage
- Indoor parking

Outside building:

- Parking place
- Sidewalk or footpath
- Public transportation vehicles

- Road crossing
- Roundabout
- Grade separated facilities e.g. underpass over pass
- Bus stop
- Railway station
- Water port

Universal Design is a relatively recent paradigm that emerged from ‘barrier-free’ or ‘accessible design’ and ‘assistive’ technology. It is a frame work for the design of places, things, information, communication and policy to be usable by the widest range of people operating in the widest range of situations without special or separate design. Universal design refers to a broad spectrum solution that produces buildings, products, transportations and environments that are usable and effective for everyone, not just people with disabilities.

## 4 METHODOLOGY

It was found that two different ways could be followed to identify the deficiencies in accessibility: disabled people approach and location approach. As disabled people were the ultimate claimers of the accessibility. For checking the output of two approaches preliminary survey and visit were conducted. The preliminary survey was consisting of mainly questioner survey. It was conducted among twenty people with different types of disabilities. The results of the questioner survey were of basically personal experiences related to accessibility. Onsite accessibility deficiencies were found by visiting different locations and observing the provision of accessibility. It was come across through preliminary questioner survey that different kinds of disabled people faced different types of difficulty is accessibility and the difficulty varied with the social and economic conditions. It was very arduous to generalize the accessibility deficiencies. The observations of the visited places inferred that there were deficiencies in accessibility for disabled people but the actual extent of result was not obtained. At this stage a distinct objectives were defined. It was found that though the disabled people had to face deficiencies in accessibility they needed to move to some definite places like hospital.

## 5 ACCESSIBILITY PROBLEMS IN MOVEMENT

Accessible transportation is more than a matter of making a few changes in the design of transport vehicles. To be truly accessible, public transport must be safe, reliable, and affordable for those who need to use that transport. Accessible public vehicle has no value unless associate infrastructures (footpath, bus stop etc) are accessible. So the deviancies of all link facilities were scan for finding root gaps of accessibility.

### 5.1 *Footpath*

Pedestrians receive less attention in the road designing. Even in some cases violation of their right was observed. Footpath is a facility which helps to segregate the pedestrians from the vehicular traffic. In road environment, the disabled people should be treated more vigilantly than pedestrian because of their limitation in movement. The barrier and deficiencies found in footpath environment are described below:

- Absence of footpath landing
- Discontinuous footpath due to frequent assess from road adjacent abutting properties
- Illegal and nuisance parking on the footpath
- Uneven surfaces, signboards, merchandise and garbage on sidewalks
- Presence of unwanted obstructions
- Disordered movement of pedestrians
- Inappropriately installed ramps
- Absence of tactile paving for providing direction of visually impaired people

### 5.2 *Road crossing*

Disabled and older people are slow in nature. They are found in most vulnerable situation while crossing a driveway. Some deficiencies in road environment that made their situations worse are:

- Absence of curb ramp at the zebra-crossing position
- Absence of tactile surfacing and audible sign for guiding visually impaired people
- Disordered movement of pedestrians
- Inappropriately installed ramps
- Disrespect by drivers of approaching vehicles

### 5.3 Vehicles of public transportation

The vehicles were found with no provision of providing accessibility to wheel chair user. Some other types of disabled people can find some facilities like reservation of seat and grab rail. But due to ignorance and lack of awareness of general people the provided privileges are not found to be usable. The most common constraints found against accessible movement in the vehicles are:

- Most bus operators do not comply the mandatory rule to keep seat reserved for the disabled and accessibility is also denied by the helpers of buses (Accessibly problems are shown in Photograph 2)
- High entry steps with high risers (the distance from the ground to the first step is typically between 30 cm to 50 cm)
- No provision of ramps or at-grade boarding
- Lack of sufficient grab rails both at the entrance and within the vehicle
- Lack of color contrast at the place of offset and where change in grade is present
- Slippery or split-level vehicle floor surfaces
- Narrow aisles and seat spacing (inaccessible leg-room)



Photograph 2. Access is discouraged by the helpers: A typical accessibility problem of disabled passengers (Usually helpers make their life more helpless since they considered them as a slow passenger and a great hindrance for providing speedy services)

### 5.4 Bus stops

Most of the local public bus has no ticket counters. The fare is collected in the vehicle. As a result the drivers of those buses are used to just make slow their vehicle for loading and unloading people. Due to scarcity of local public bus, passengers want to get in to the bus as early as possible. That is why the function of bus stop is found very insignificant at many places. The absences of features which have made the bus stops unacceptable on the accessibility point of view are:

- Absence of audible sign for helping blind people
- Absence of curb ramp for wheelchair users
- Absence of tactile surfacing for guiding blind people
- No fixed position of stopping of bus

### 5.5 Overpass and underpass

Overpass and underpass are grade separated facilities for pedestrian crossing. These facilities are not designed to access by the wheelchair users. The following specific deficiencies were observed during the study:

- For visually impaired people no deep colored marking are provided.
- For comfort of the people a landing should be provide after every 12 steps. Most of the cases the landing is not provided.
- The lighting condition and environmental condition are found poor at every underpass
- Due to lack of maintenance the surface of stair of overpass became slippery

## 5.6 *Bus terminal, railway station and water terminal*

Bus terminal, railway station and water port are example of the public places where the accessibility of disabled people should be ensured. Because for inter-district journey people have to move to these places. No accessibility facility was found for visually impaired people at these places e.g., no audible sign, no detectable warning sign for visually impaired people. At bus terminal and railway station there are some facilities which can be used for facilitating wheelchair users. But most of them are not treated and maintained as per specifications. The basic accessible problems arise for those people who use public transportation to reach the terminals. No accessible path was found for wheelchair users and no guidance path was found for blind people to reach the terminal for bus stops.

## 5.7 *Problem during mode change*

The city of Dhaka contains a huge number of inhabitants. This city is visited by a certain number of people for different purposes. But the numbers of the buses are not found adequate to provide facility to all of the people of Dhaka city. The other mode like taxis and auto rickshaws is not seemed to be sufficient. Besides the unwillingness of the taxi and auto-rickshaw drivers to provide service to disabled people is another big problem. In the resident area the main transportation facility is provided by rickshaws. But overall transportation system is not suitable for disabled people. Because:

- The bus use to take passenger from here and there- bus stops are not used for loading and unloading of passengers
- The distance between rickshaw stops and bus stops become difficult for disabled people specially wheelchair users
- The path used to travel to rickshaw to bus is not accessible and not handicapped friendly

As a whole, for complicated route planning as well as absence of proper alternatives, the present public transportation system is found to be ineffective for disabled people.

# 6 CASE STUDY

## 6.1 *Case study 1: Centre for disability in development complex*

Centre for Disability in Development (CDD), an organization working for the disabled people, should be appreciated for constructing their CDD complex with the provision of following the universal accessible design. The building is used as a workshop of the organization and it is built in 2008 at Talbag of Savar. The Building was built with the financial help of Japanese embassy. The key features which made the building accessible for all kinds of disabled people are:

- A metal plate which provides the information about the floor plan of the building by both Bangle language and Braille sign (Photograph 3 )
- A 20 feet long ramp with 6 feet width and 1: 18 slope is provided at the entrance
- Contrast color is used to make the edge of stair easily perceivable
- Tactile surfacing are provided to guide the blind people for identifying the rooms easily (Photograph 2 )
- Hand rail is provided at the position of ramp and stair to facilitate the weak people

## 6.2 *Case study 2: Mirpur inter-zonal bus terminal*

Mirpur Inter-zonal Bus Terminal, situated at the West end of Dhaka city, is the terminal point of the bus route from west zone to Dhaka. That is why the bus terminal was considered as a zone of interest for accessibility for disabled people. The bus terminal situation did not found to be fully accessible and disabled friendly. In spite of that some access aiding features were found for facilitating wheel chair user. Sufficient ramp was found to be provided for making accessible for wheel chair user. By measurement, it was found that the width of the ramp is 1500mm and the slope is 1:12. A well accessible restroom for passengers was found at the bus terminal. But due to lack of proper signage and directions the restroom was found difficult to locate. The other facilities for the passengers were not found to be comfortable.

- Total terminal plan was not found to be provided at any part of the entrance. Moreover, the lack of proper directions and signage made impossible to move a blind independently.
- No special feature was seen that could facilitate the semi-ambulatory people for boarding independently.
- It was found that some ramps became unusable due to lack of maintenance and temporary shops.
- No central system of announcement of departure of bus was found.



Photograph 3. Board with Braille sign of details floor plan



Photograph 4. Tactile surfacing for guiding the blind

## 7 SOME PRACTICAL GUIDELINES TOWARDS ENHANCING ACCESS AND MOBILITY OF PERSONS WITH DISABILITIES

Some guidelines are needed to be intended to assist policy-makers and personnel involved in development work who may be engaged in the promotion of access and mobility of persons with disabilities in their understanding the importance of some elements of access and mobility of persons with disabilities. The list is not exclusive, but rather covers specific aspects of the transport environment.

### 7.1 *Improved pedestrian environments with parallel to public transport systems*

Safe and accessible sidewalks should have appropriate width (minimum 1200 to 1500mm), good surface without obstructions such as potholes and tree roots, free from overhanging objects and ramped for wheelchair users and other persons who have ambulatory problems. To preserve usability and continuity of the walkway, it is critical that it be kept clear of rubbish, dirt, street works, parked cars and other obstacles. Tactile guide way and tactile warnings should be installed for the use of visually impaired persons. Along frequently used pedestrian ways seating could be provided at regular intervals. Street works especially when left should be guarded by a continuous, rigid barrier along the entire perimeter. (Takamine, October 2004)

Curb ramps should be used wherever footways cross roads, pavements, medians, or other raised surfaces. At signalized intersections audible signals can be useful to visually impaired pedestrians. Tactile surfaces are important at the edge of street crossings to warn visually impaired pedestrians they are about to step on to the road. Various methods can be used to increase crossing safety by reducing the speed of vehicles. Raised crosswalks can be used both to slow down traffic and to provide a level crossing for pedestrians. Raised crossings should be designed with a minimum width of 2400mm and built at the same level as the sidewalk.

## 7.2 Improving bus systems

The height and steepness of steps in high-floor buses are often major barriers to users with disabilities. Entrances can be improved through adequate design of steps and installation of handrails and grab handles. Priority seats are especially important in overcrowded buses. In buses that stop on request only, bell pushes can be useful to signal a request for the next stop. This makes it not only much easier for speech and hearing impaired persons to use the bus, but also safer for all passengers by not having to leave their seat while the bus is moving. Clear legible destination and route number displays on the outside of the bus are essential for partially-sighted passengers to identify their bus, and helpful for all passengers especially at night. The best way to allow wheelchair users to board buses is through the use of low-floor buses with extendable ramps, or high-floor buses with raised boarding platforms. These options also benefit the operator by speeding up boarding and alighting. Other options include the use of mechanical lifts and level boarding from small roadside platforms, using a removable bridge piece to cover the gap. Improving operating practices is also a low-cost intervention, but it will need some amount of retraining and supervision of drivers and conductors. Practices such as the calling out major stops, consistently drawing up close to curbs, consolidate driving habits, will work best in the context of general improvement in customer orientation in bus services (Takamine, October 2004).



Photograph 5 . Bus stop with ramp for aiding wheelchair access in buses

## 7.3 Accessibility improvement for informal public transport vehicles

Public transport services are increasingly provided by informal public transport operators who operate minibuses, minibuses, motorized rickshaws, and other informal vehicles. A characteristic of these services is that they are typically provided by a large number of individual owners or operators who hire/rent the vehicles on a daily basis and hence have to guarantee the daily income to the owner before generating income for them. The vehicles operate on relatively flexible routes and schedules and authorities typically have very little regulatory control over them. Major problems are fiercely competitive operating conditions often leads to overloading and to a refusal to stop for disabled persons due to a perception that they will prolong boarding time. The only way to improvements can be made to the accessibility of vehicles-either through government-sponsored renewal of fleets or incrementally as vehicles are slowly replaced-is predicated on governments succeeding in establishing stronger regulation and formalization of the industry, both in terms of vehicle standards and of operating practices. Only then will it be possible to comprehensively address accessibility issues in small vehicles (Takamine, October 2004).

## 7.4 Door to door transport service

Not all disabled persons will be able to use regular (fixed route) public transport served by buses or railways even where significant access improvements have been made. Significant percentage of passengers with disabilities will require door-to-door transport. Such transport may be provided by accessible taxis, accessible vans, or a variety of smaller vehicles. This type of transport is inherently more expensive than fixed route transport. Yet door-to-door transport is critical to the survival and productivity of some disabled persons who cannot use accessible fixed route vehicles. Thus, this type of service needs to be subsidized by local governments or non-profit organizations. Without such subsidies, majority of persons with disabilities cannot afford to use them. Door-to-door service could be developed as an interim measure as it may take a long time to make accessible fixed route transport (Takamine, October 2004).

## 7.5 Training

Wherever public transport services have become increasingly more user-friendly towards people with disabilities, the training of staff, managers and officials has been an important element. In Bangladesh, this is particularly important as managers, drivers and conductors often do not have a service ethos toward their passenger, let alone sensitivity towards passengers with special needs. Disabled passengers consistently identify attitudinal barriers and ignorance as a major barrier restricting them from using public transport.

Modules on disability awareness may be developed which help transport staff to view their jobs in terms of promoting equality, rather than undertaking welfare work. It is usually useful to involve disabled persons' organizations directly in the training. It is also important to expose not just front-line staff to disability awareness training, but also those who design, plan and manage transport systems. Many formalized public transport operators routinely train their staff in safety and operational aspects of the service. Modules on disability awareness can easily be incorporated into these programs, especially for new recruits. Orientation, also called travel training, can be offered to assist new passengers who have never traveled by public transport before. Training may be especially important to persons with cognitive disabilities, many of whom can independently use public transport if it is reliable and predictable. Public transport operators can work effectively with disabled persons' organizations and social workers to promote travel training (Takamine, October 2004).

## 7.6 Some other improvements

Some other improvements can be provided for ensuring accessibility. The facilities are basically high cost and mainly for specific purpose. If in a region movement of disabled people are found very high the improvements can be applied.

Rickshaw is our one of the available mode of transportation for short distance trips. But Wheelchair users can not use it with full access. So some modified rickshaw can be provided where wheelchair users' movement are found frequently.

At a busy road disabled people feel unsafe crossing road at grade level. Elevator attached with the pedestrian overpass can help them. At a place where disabled people are found available this kind of facilities can be provided. Where elevators are not feasible lift ramp can be provided.

## 7.7 Cost-benefit of interventions for accessible transport systems and priority

The interventions mentioned in Table 2 relate mainly to the urban environment where the demand for services is high and the marginal costs of improved design and special facilities tend to be low. In the rural context it is often very difficult to establish basic transport services to be sustainable because of the low population densities and limited economic activity.

Table 2. Interventions for more accessible transport system: indicative priority

Marginal		Typical Intervention	Probable Priority
Cost	Benefit		
None	Mostly broad	Visual contrast, color coding clear/intuitive signs,	Essential – these should be established design practice
Low	Broad	Basic sidewalk and crossing design ,hazard markings, minimize steps and other hazards,	Very high - should be established design practice
High	Broad	Raised pedestrian crossings, raise boarding platforms or low-floor vehicles, general training of operational Staff	High – should be considered Practice for safe street environment, subject to Resources
Low	Specific	User awareness, priority seating, additional training of operational staff, Tactile surfaces, curb insets	Very high – subject to policy For resource allocation
High	Specific	Elevators, illuminated and audible signals, wheelchair location, special Transport services	High – subject to policy for resource allocation

\*Source: Roberts & Babinard, May 2004

## 8 CONCLUSIONS AND RECOMMENDATIONS

From the study it is found that disabled people are less cared population in our country. It was found that the disability has a direct connection with poverty. The study reflects that the government and society has a very little concern about providing accessibility to disabled people. Though there is an attempt for ensuring accessibility for disabled people through incorporating universal design concept. It was found from the study that the practice of the accessibility in Dhaka city is trivial. The practice of accessibility is limited mainly to the public places. But due to lack of integration of the provided facility has no significant effect. It was found that the public transportation sector had failed completely to provide proper access facility to the disabled people.

Though all public place should be taken under consideration of improvement process. At initial stage the locations e.g., hospital and adjacent footpath and bus stop should be identified where frequent movements of disabled and elderly people are observed. Proper technical treatment can easily ensure the accessible environment for disabled people. Only technical improvements are not sufficient for proper function of the access features. In order to achieve full efficiency some social awareness and imposing regulations must be adopted.

Technical improvement has no value unless the disabled people are aware of that. So the awareness of disabled people must be increased. Special education should be provided for people for make them aware about provided accessibility. Believe should be grow among them that accessibility is their right.

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