

# Transport, Poverty and Disability in Developing Countries

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## Technical Note

<b>Transport, Poverty and Disability</b> .....	<b>i</b>
<b>in Developing Countries</b> .....	<b>i</b>
Technical Note .....	i
<b>1. Introduction</b> .....	<b>2</b>
1.1 Guiding Principles .....	2
1.2 Classifications .....	2
<b>2. Policy Context</b> .....	<b>3</b>
2.1 Traffic safety in developing countries .....	4
2.2 Sectoral and policy issues .....	4
2.2.1 Decision-making process.....	6
2.2.2 Regulatory environment .....	7
<b>3. Technical Issues</b> .....	<b>8</b>
3.1 Non-motorized transport and disability .....	10
3.2 Motorized transport and disability .....	12
<b>4. Public Awareness</b> .....	<b>14</b>
4.1 Education .....	14
4.2 Training.....	14
4.3 Marketing.....	15
4.4 Stakeholders .....	16
<b>5. Performance Criteria</b> .....	<b>16</b>
5.1 Data Collection .....	16
5.2 Evaluation criteria for performance.....	16
<b>6. Financial Issues</b> .....	<b>18</b>
6.1 Costs of improvements .....	18
6.2 Implementation.....	19
<b>Bibliography</b> .....	<b>20</b>
<b>Annex: Case Studies</b> .....	<b>22</b>
National-Level Access Legislation and Policy Provisions, Case Study: India <sup>(1)</sup> .....	22
The Role of Educations Systems, Case Study: The Philippines <sup>(2)</sup> .....	25
Accessibility Progress in the “Rio City Project”, Case Study: Brazil <sup>(3)</sup> .....	26

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## 1. Introduction

Inclusive transport is a critical element in a comprehensive strategy of mainstreaming people with disabilities in developing countries. Transport systems that exclude people with disabilities virtually guarantee that people with disabilities will be poor, since such systems may well preclude education, prevent participation in the labor market, and restrict access to health and other social services. Apart from creating “income poverty” for people with disabilities, exclusive transport systems also deprive people with disabilities of social, cultural and political opportunities.

When analyzing the environment with regard to transport and disability, two main perspectives need to be considered. These perspectives are access to and accessibility of the built environment. **Access to** the built environment includes the possibility of all people to reach all places within the built environment. **Accessibility of** the built environment includes the possibility of all people to maneuver and make use of the built environment in an unassisted way.

The physical environment is a multidimensional continuity of space. All users of this space, including people with disabilities, have the right to use it and should be given the possibility to move around in this environment without restrictions. This possibility of moving around can be restricted not only by physical barriers but also by cultural, social and economic barriers.

It has been estimated that there are about 400 million people with disabilities in developing countries. According to the estimate of ECMT, a share of 10-14 % of the population of most countries in the world have some form of functional limitations which prevent them from using easily or safely all or some forms of transport.

Good guidelines for policy and planning decisions are essential for creating and maintaining accessible environments for all people including different disability groups. The consideration of accessibility to all people with disabilities has not been given significant priority in development and construction plans in developing countries to date. However, some developing countries are experiencing rapid economic growth which leads to industrialization and urbanization and thus to accelerating construction. Other developing countries have suffered the destruction of armed conflict or natural disasters, and hence enter a period of rapid construction. Consequently, special attempts should be made to incorporate the access needs of people with disabilities in this construction work. A number of countries have already recognized this demand and started to promote actions related to a barrier-free built environment for different disability groups.

### 1.1 Guiding Principles

All parts of the built environment should be accessible to all people including different disability groups. The equal opportunities to participation should be ensured by attempting to meet the objectives related to the following guiding principles (*ESCAP, 1995*):

## **Reachability**

Provide a possibility for all people including disabled and elderly persons to reach all places of the built environment.

## **Accessibility**

Provide a possibility for all people including disabled and elderly persons to approach, enter, pass and make use of the built environment and its facilities without assistance.

## **Usability**

Provide a possibility for all people including disabled and elderly persons to use and enjoy the built environment.

## **Safety**

Provide a possibility for all people including disabled and elderly persons to move in the built environment without undue hazard to life and health.

## **Workability**

Provide a possibility for all people including disabled and elderly persons to fully participate in and contribute to the work force.

## **1.2 Classifications**

People with disabilities do not form a homogeneous group. It is important to understand the nature of access requirements of different disability groups for the creation of fully accessible environments. The following disability groups and their subgroups can be identified for the purpose of the design of the built-environment (*Design Manual – Access for the Disabled, 1984*):

### **1. People with orthopaedic disabilities**

This group includes people who generally have locomotor disabilities, which affect mobility. The two subgroups include:

- (a) ambulant people with disabilities**, who are able, either with or without assistance, to walk and who may walk with or without the aid of devices, such as crutches, sticks, braces or walking frames.
- (b) people who use wheelchairs, tricycles, push carts etc.**, who are unable to walk either with or without assistance, and who, except for the use of mechanized transport, depend solely on wheeled equipment for mobility.

## 2. People with sensory disabilities

This group includes people who as a consequence of visual or hearing impairment may be restricted or inconvenienced in their use of the built environment. The two subgroups include:

- (a) **visually-impaired / blind persons**, who rely on their sense of hearing, touch and smell.
- (b) **hearing impaired persons**, who rely on their sense of sight, touch and require written information.

## 3. People with cognitive disabilities

This group includes people who have a mental illness, a developmental or a learning disability.

## 4. People with multiple disabilities

This group includes people who have a combination of orthopaedic, sensory and/or cognitive disabilities.

## 2. Policy Context

The access policy provisions and legislation should include the promotion of barrier-free built environments for all people and integrating the access requirements of people with disabilities into the planning and design of built environments. Adequate legislation, comprehensive design criteria and sufficient education and training of concerned parties are the cornerstones for the creation of a barrier-free environment in developing countries.

The most efficient strategy for promoting a barrier-free environment would include a combination of different approaches but stressing the significance of an appropriate approach at different stages of development:

**Economic approach**, which emphasizes the cost-effectiveness and other economic benefits in increasing the involvement of different sectors of society in the promotion of an accessible built environment.

**Incentive-disincentive approach**, in which the promotion of accessibility is encouraged by a combination of incentives.

**Good practice approach**, which aims at incorporating the creation of barrier-free environment into everyday thinking in society.

**Mandatory approach**, which is based on the compliance of legal instruments or administrative decrees.

**Initiative approach**, which focuses on increasing the sensitivity and responsiveness as well as promoting the active role of different sectors in society to the access needs of people with disabilities.

**Social responsibility approach**, which emphasizes the fulfillment of the responsibility of different sectors of society to contribute to the elimination of barriers encountered by people with disabilities.

## 2.1 Traffic safety in developing countries

The high rate of traffic accidents is a leading cause of different forms of disability in developing countries. It is estimated that approximately 750 000 – 880 000 people died prematurely in road traffic accidents in 1999. A share of about 85 % of these occurred in developing countries (*Transport Research Laboratory & Ross Silcock Limited, 2000*). According to another estimate, nearly half a million people die and up to 15 million are injured in urban road accidents every year in developing countries. The estimated direct economic cost of this is between 1-2 % of GDP (*Cities on the Move, A World Bank Urban Transport Strategy Review, 2000*).

According to WHO and Red Cross studies, road crashes were already important as a cause of death or disability in the developing countries in the year 1990 and will become even more dominant cause by the year 2020. The results of this forecast indicate that for developing countries only, road crashes as a cause of death will move up to second place and road crashes as a cause of “disability adjusted life years” (DALY's)<sup>2</sup> will move up to second place by the year 2020. It can be noted that buses cause a disproportionately large percentage of fatalities and injuries due to poor vehicle maintenance, unsafe road conditions and unsafe driving habits.

The gender difference is significant with regard to the significance of traffic accidents as a cause of deaths and injuries. According to the WHO World Health Report 1999 database, males constitute a share of 73 % and females a share of 23 % of all deaths or injuries caused by road traffic accidents in the low and middle-income countries in the world.

A share between 35 – 70 % of all accidents occurs in urban areas. Pedestrians and cyclists constitute the most vulnerable group for accidents and account for more than twice the share of those injured in developing countries as compared to developed countries. Therefore, the fear for personal safety and security deter the use of non-motorized transport.

## 2.2 Sectoral and policy issues

The right and possibility of using space is regulated in most countries by introducing legislation for accessibility. Space can be divided into different components depending on the perspective. Space can be observed from the viewpoint of various interest groups: the user,

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<sup>2</sup> Disability adjusted life years (DALY's) = express as years of life lost to premature death and also years lived with a disability, adjusted for the severity of the disability.

the State, the legislator, the market or the owner. This can result in the erection of barriers that hinder free movement. The full participation of the aforementioned interest groups and people with disabilities calls for the elimination of these barriers.

The right of people with disabilities to use the built environment can most effectively be guaranteed by enacting access legislation<sup>3</sup> and formulating comprehensive access policies. As far as legislation in various countries is concerned, a survey should be conducted in order to identify all the legal provisions regarding people with disabilities. This calls for the amendment<sup>4</sup> and elimination of restrictive legal provisions, which discriminate against any groups of people with disabilities.

Figure 1 shows the successful development process of access policy provisions and legislation. The key steps toward the formulation and application of access legislation include:

**Pre-formulation:** The mobilization of grassroots support and additional support from key persons / organizations (e.g. government officials, political parties, non-governmental organizations, professional associations and providers of community services, disabled people's organizations).

**Formulation:** The results of pre-formulation will be considered in this formulation step, in which policy provisions and access legislation are drafted. The feedback from public opinion and people with disabilities as well as enactment should be taken into consideration in the actual formulation step.

**Implementation:** This step includes the application of access policy provisions<sup>5</sup> and legislation which are formulated and for which feedback is obtained from the previous step.

**Enforcement:** This step includes the enforcement of the new provisions and access legislation.

**Monitoring:** The enforcement will be monitored through feedback from consumers, people with disabilities and the public and includes a review process of the current legislation, guidelines and standards and the development and improvement of these components. Furthermore, the implementation and reviewing of access legislation should be conducted in

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<sup>3</sup> Access legislation = An enactment passed either by national, provincial or State legislatures, or by any body empowered by the respective constitution to legislate, in order to provide people with disabilities and elderly persons with access to the built environment; it may cover the following areas: buildings, public facilities, roads and transport systems.

<sup>4</sup> Amendment = Modification of a law, by-laws, as well as rules and requirements, in the form of additions, alterations or repeals of provisions of such law, by-laws, as well as rules and regulations, e.g. building codes and building by-laws

<sup>5</sup> Access policy provision = An administrative order issued by the Government (national, provincial or State, and local), which stipulates concessions (e.g. tax deductions or travel concessions) or incentives (e.g. preferential treatment in the allotment of construction sites) to promote the accessibility of the built environment for people with disabilities and elderly persons.

concordance with the other relevant legislation and safety regulations, which concern the built environment.

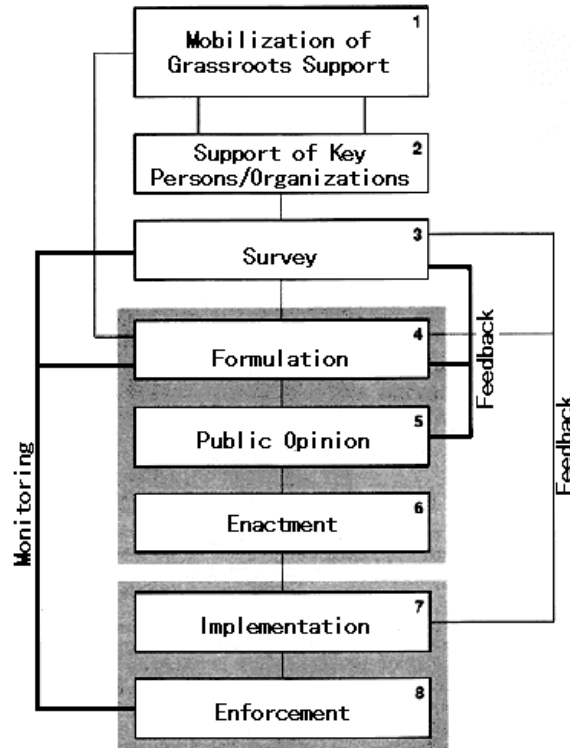


Figure 1. Key steps towards the formulation and application of access legislation (source: ESCAP 1995, [www.unescap.org/decade/publications/z15009gl/z1500905.htm](http://www.unescap.org/decade/publications/z15009gl/z1500905.htm)).

### 2.2.1 Decision-making process

In most countries the planning and decision-making process is very complex. Democratic attitudes, the level of social consciousness and the respect for the citizens' constitutional rights constitute the legal prerequisites for the planning process. These prerequisites vary, however, between e.g. state-owned and private-owned facilities. This is primarily due to the controversy between informal and institutional interests. Also, the planning and building process has economic impacts by affecting both the life of an individual and the entire social structure of the population.

The construction of infrastructure is always preceded by a planning and design stage (figure 2). This is usually regulated and controlled by accessibility criteria (various codes and standards), which are derived from national legislation. A local building authority usually provides a permission for construction which is controlled and managed by the authorities.

Public responsibility and control are guaranteed through public awareness, research and development as well as the support from different organizations and action of different bodies. Experience from users is of great significance and the feedback from authorities and the organizations of various disability groups should be forwarded back to the planning and decision-making process. The public awareness process is discussed in more detail in chapter 4.

## 2.2.2 Regulatory environment <sup>6</sup>

It is common in developing countries that the privatization of bus services has occurred in the absence of government regulation. The leading principle in this development has been profit maximization focusing on minimizing costs rather than promoting efficiency.

The “minimizing cost” approach creates a sharp antagonism between the interests of bus drivers or fare collectors, on the one hand, and potential disabled and elderly passengers, on the other. By paying drivers per passenger directly out of fare revenues, rather than per hour or per kilometer driven, the incentive is provided for drivers to work dangerously long hours while driving poorly maintained vehicles in a dangerous manner at high speeds, while often not bringing their vehicle to a full stop at bus stops. (Passengers may have to jump on or off.) For the same reason, drivers feel they must resume motion without giving boarding passengers a chance to find a seat or even to position themselves to endure their ride, thus causing further injuries and all but guaranteeing that anyone with even a modest mobility handicap is unable to use public transportation. In other words, the “minimizing cost” approach probably denies the use of public transportation in the poorest countries to somewhat in excess of the 10% figure for disability used by the United Nations or the 12% used by the European Conference of Ministers of Transport. This approach creates accidents that cause more disabilities and creates inaccessibility.

The largest single impediment to access in the poorest countries is the lack of regulation and enforcement to require that vehicles be driven safely. All discussion of “universal design” and accessibility features for mobility- and sensory-impaired passengers presupposes that vehicles come to a full stop at safely located designated stops and that elderly and disabled passengers are able to board while the vehicle remains stopped and, ideally, that such passengers are seated or able to grasp a hand-hold. Thus the biggest single impediment to accessible transportation is a set of operating procedures which are often associated with unregulated privatization. The key word is “unregulated.” Privatized services can operate in extremely efficient and accessible manners under proper conditions.

The issue of regulatory environment is going to need a great deal of attention. The transportation portion of the private sector can be a major source of employment for persons who might otherwise be jobless. If little regard is given to training and licensing, the costs of putting an employee to work is low. Lima, Peru, is a good example, where several thousands of unregulated vehicles have been added to the transport system in recent years, each with a driver and a “cobrador” (fare collector). The result is profound traffic congestion, pollution, and lower transport efficiency. Fortunately, steps are being considered to address this situation,

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<sup>6</sup> This section was contributed largely by Tom Rickert of Access Exchange International, San Francisco, USA.

perhaps modeled after some of the many best practices found in Curitiba, Brazil, where privatized transportation is operated in a safe and cost-effective manner.

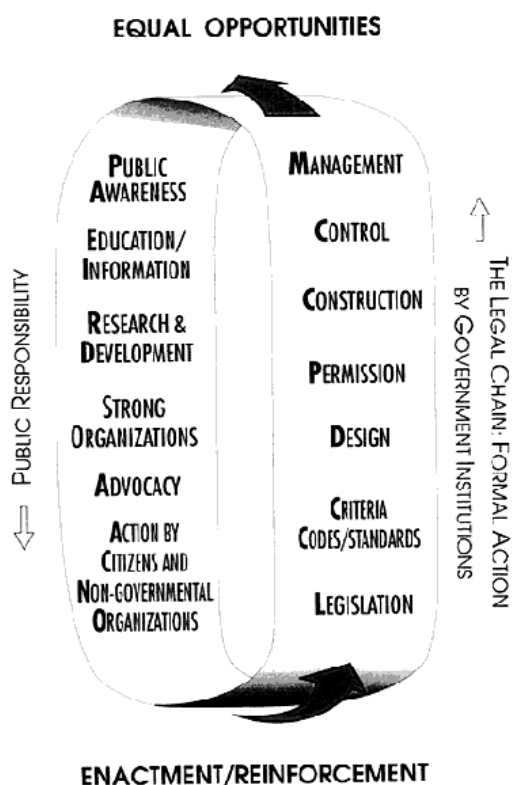


Figure 2. Continuous decision-making process in access promotion.  
 (source: ESCAP 1995, [www.unescap.org/decade/publications/z15009gl/z1500902.htm](http://www.unescap.org/decade/publications/z15009gl/z1500902.htm)).

### 3. Technical Issues

It is important to understand the mobility and access requirements of people with functional limitations when planning and designing for barrier-free movement in the built environment. Moreover, it is important to understand and identify the circumstances, which create barriers for people with disabilities.

Furthermore, the improvements implemented for providing barrier-free environment for people with disabilities also contribute to the mobility of all people. User requirements differ but all people have the same needs regarding accessibility. Consequently, the entire transport system should be created on the basis of an inclusive planning approach. A barrier-free

environment has several unintended benefits for enhancing the mobility of various groups of people, for example, people carrying loads, mothers with strollers and school children.

According to recent studies in developing countries, the share of non-motorized transport varies between 25 – 50 % in major Asian cities. Around 50 % of all trips in major African cities are made entirely by walking. In smaller and medium-sized cities, the share of walking can increase to 60-70 % and mainly dominates for shorter trips.

The user requirements for barrier-free movement differ between non-motorized and motorized access as well as between the various disability groups listed in chapter 1.2. Chapters 3.1 and 3.2 contain a brief overview of the main requirements and needs of different disability groups in different environments. Boxes 3.1 and 3.2 contain some examples of design principles and guidelines for a barrier-free environment. More detailed requirements and design criteria can be found in the references attached to chapters and included in the bibliography.

Depending on the level of existing development and local circumstances, various priorities in promoting accessibility can be adopted. In some circumstances there could be a special emphasis on developing disability features of non-motorized transport when such transport modes are in common use and bus service may be limited or unavailable. In other circumstances, access features of motorized transport should be stressed due to the key role these systems may play in providing the majority of trips to all passengers.

**Box 3.1. Design Guidelines for Footpaths and Footways** (source: ECMT 1999, *Improving Transport for People with Mobility Handicaps*)

**Purpose**

Provision of safe, easy access for everyone walking or using a wheelchair

**Guidelines**

- ?? a minimum obstacle free footway at least 1800 mm wide – preferably 2000-2500 mm
- ?? width should be greater at bus stops (minimum 3000 mm) and in front of shops (3500 mm or more)
- ?? if possible gradients should be not more than 5 per cent (1 in 20) to cater for self-propelled wheelchairs: this should be used as a design limit in new development
- ?? where gradients are unavoidably steeper than this, level areas (preferably 1800 mm long) should be incorporated at intervals of 10 meters
- ?? crossfalls, which are needed to make sure rain water drains away quickly, should not be more than 2,5 per cent (1 in 40). Anything steeper than this makes it difficult for a wheelchair user to steer in a straight line
- ?? where there is a drop or steep slope at the rear side of a footway (or both sides of a footpath) a 100 mm edging upstand should be provided as a safeguard for wheelchair users and as a tapping rail for long cane users
- ?? surfaces should be non-slip, well maintained and any joints between paving slabs should be closed and flush to avoid catching the small wheels of a wheelchair
- ?? covers and gratings should be non-slip and flush with the pavement surface
- ?? nothing should overhang the footway (signs, tree branches etc.) to a height of less than 2100 mm (preferably 2500 mm)
- ?? where it is not possible to avoid having obstacles in the pavement, such as lamp-posts, traffic signs etc. should have a contrasting band of colour 140 mm to 160 mm wide with the lower edge 1,5 to 1,7 meters above ground level. Trees in footway should have a distinctive surface around them (for example grating or pebbled) to warn blind people
- ?? seating should be provided at regular intervals of around 100 meters.

### 3.1 Non-motorized transport and disability

Persons, who have orthopaedic disabilities and especially those who use wheelchairs require several features, which provide for their access to buildings and the external environment. The common forms of non-motorized transport (NMT) include e.g.:

- ?? wheelchairs
- ?? tricycles, (hand-powered trikes)
- ?? rickshaws
- ?? push carts

**Box 3.2. Design Principles for Routeing Systems in Terminals** (source: COST 335, *Passenger's Accessibility of Heavy Rail Systems, 1999*)

**Purpose**

To give guidance regarding the main layout of the terminals

**Logical layout**

- ?? Main functions located in a logical step-by-step progression
- ?? Secondary functions clearly separated from but located adjacent to main functions
- ?? Having goals in sight enables passengers to understand the route quickly and easily – main facilities clearly visible from main entry, from platform end and at all stages through the building.

**Circulation system**

- ?? All passengers should follow the same route, as a matter of principle
- ?? Functions / facilities located adjacent to, not intruding into main circulation space
- ?? For passengers to maintain a sense of direction, the route should follow a straight line through a clearly defined space
- ?? Changes in the direction should be avoided wherever possible
- ?? A succession of bends, or bends at angles other than 90 degrees contribute to loss of direction and should be avoided.

Some of the most important features for accessibility for non-motorized transport contain:

- ?? paved surface, pedestrian walkways
- ?? level access + curbs
- ?? ramps
- ?? lifts/elevators
- ?? handrails and grab bars
- ?? larger toilet cubicles
- ?? clear signs
- ?? sufficient width in paths, doors, entrances, lobbies and corridors.

Persons in the group of sensory disabilities and especially the visually impaired persons require certain aspects of sound, texture and aroma incorporated in the built environment. Recommendations of these features include:

- ?? use of guide blocks in public facilities and terminals
- ?? reduction of contrasts and glare
- ?? use of different colors and textures to indicate e.g. differences in floor level or various fixtures
- ?? use of different patterns to indicate barrier-free paths and areas.

Additionally, the hearing-impaired persons also need signs and color to assist them in moving around their surroundings. Special features for this disability group include e.g.:

- ?? clear and accurate visual signs, electric and flashing information signs
- ?? emergency alarm systems with flashing lights
- ?? different types of hearing aids
- ?? reduction of background noise
- ?? good acoustic conditions in the interiors of buildings.

Furthermore, persons with cognitive disabilities require a combination of the above mentioned features. Finally, persons with multiple disabilities obviously need a proper combination of all specific features listed above.

When setting priorities to different features, the spatial requirements of persons who use wheelchairs exceed the needs of other disability groups. Also, wheelchair users often have an assistant to accompany them, which increases the requirements for space. Thus, planning and design need to focus on both independent and assisted wheelchair access.

*(For more detailed design recommendations, see e.g. “ Designing with Care, 1981”, “Promotion of Non-Handicapping Physical Environments for Disabled Persons, 1995” or “Accessibility for the Disabled, A Design Manual for a Barrier Free Environment, 1999”)*

### **3.2 Motorized transport and disability**

Modern technology has been applied to provide an opportunity for people with disabilities to drive a private vehicle, if they can afford to purchase one. However, most of the people with disabilities have to rely on public transport services for motorized transport. Vehicles used in public transport services (buses, trams, taxis, minibuses, trains, airplanes, ferries etc.) should be designed so that they include facilities to accommodate people with disabilities.

As far as different modes of public transport are concerned, not only should the vehicle itself be accessible by e.g. a wheelchair, but also the route to the bus stop, train station etc. should be barrier-free. Vehicle fleet of older design often has special ramps and secured spaces for wheelchair users. New low-floor design has enabled easy access to buses for the people with disabilities in addition to secured spaces.

Railway stations should be designed to maximize accessibility by providing barrier-free movement for entering the terminal building and moving on to the platforms and trains (see Box 3.2). This requires e.g. sufficient space for moving with a wheelchair, wide turnstiles, lift to platforms etc.

Terminals for water transport also demand careful planning for full accessibility. The boarding procedures should be made as simple as possible and barrier-free movement should be ensured to the pier. Ferries should be provided with accessible ramps and there should be a secured space for wheelchairs and other forms of non-motorized transport.

Air transport has also specific requirements with regard to the accessibility of people with disabilities. The disability issue should be considered both in flight terminals and in airplanes by providing accessible boarding facilities, special spaces to accommodate wheelchair passengers, accessible toilet facilities in terminals and airplanes etc.

Some practical steps are presented in Box 3.3, which could be taken to provide far more accessible transport at about 1-2% of the combined annual operating and capital costs of a typical system, always assuming that regulatory and enforcement mechanisms are in place. The applicability of these steps would vary with the circumstances.

**Box 3.3. Practical steps toward more inexpensive solutions to improve the accessibility of motorized transport** (Source: Tom Rickert, *Access Exchange International*)

**In vehicles:**

- ?? Assure that stair treads in all doorways have anti slip surfaces, to assist mobility-impaired and all other passengers
- ?? Obtain a sharp color contrast with the rest of the vehicle (e.g. by painting hand grips with bright color), to assist passengers with low vision and all other passengers
- ?? Provide large print destination signs (e.g. made of cardboard which could be changed as needed), with good color contrast, at least on the front and preferably on the side and rear of each vehicle to assist all passengers, especially those with reduced vision and those with mobility impairments who need to quickly spot their vehicle in order to access it before it pulls away from the stop
- ?? Install prominent "priority seating" signs for seats designated for disabled and elderly passengers
- ?? If possible, request a "kneeler feature" on new buses. These air bags are not expensive in comparison to total vehicle cost and the payback is quick in terms of faster boarding/alighting of all passengers, and especially those with disabilities
- ?? If bus doors are sufficiently wide, install a network of raised ramped platforms made from low-cost local materials, with bridge plates chained to the platform or available in larger vehicles, to span the vehicle floor-to-platform gap, and thus permit the boarding of high floor buses if there is space inside for folded manual wheelchairs.

**In stations and bus stops:**

- ?? If bus stops are unpaved, consider a two meter or longer yellow curb piece to (i) provide safety for all passengers by separating the stop from traffic, (ii) permit blind passengers to feel the edge of the stop with a foot or cane, (iii), permit passengers with reduced vision to locate the stop, and (iv) permit semi-ambulatory passengers to more easily reach the first step of the vehicle, thus enabling them to more readily grasp hand holds in the entranceway.
- ?? Orient personnel to assist blind passengers and those with low vision, if they are unaccompanied by friends
- ?? Provide transport information in large print formats for passengers with reduced vision or who are deaf, and via verbal announcements for blind passengers
- ?? For overcoming smaller platform-to-car-floor differences, have a movable ramp available to assist wheelchair users, for use by station personnel
- ?? Make sure that in stations with multiple ticket counters there is one counter, which is low enough to serve short people and persons using wheelchairs.

## 4. Public Awareness

It is quite common that various superstitions and fears prevail, which result in negative attitudes and avoidance of contact with people with disabilities. People with disabilities may also reduce the social status of a family. This is due to the lack of knowledge of disability issues and limited experience in interacting with people with disabilities. Consequently, there is an urgent need for campaigns so that these attitudes and perceptions could be changed. The international and national organizations of different disability groups have a major role in these campaigns. Furthermore, the role of cross-disability groups representing multiple disabilities can be particularly effective in their advocacy with transport agencies and companies and thus the whole process can become more effective.

### 4.1 Education

It is common in developing countries that planning and decision-making on disability aspects rely on authorities, which do not have any formal training in, or have not been exposed to, accessibility issues. However, professional knowledge and good guidelines are essential instruments for building an accessible environment for all disability groups.

It should, however, be noted that sufficient knowledge of disability issues cannot be gained only by general high-level education. The educational program should be focused on the specific aspects of accessibility in the built environment. In this way, full consideration of accessibility issues can be guaranteed.

### 4.2 Training

Accessibility issues can best be advanced by continuous training programs. This should include not only fundamental training but also updating of knowledge on current development trends, which also include new legislation and standards. Furthermore, training programs should not only be directed at academic professionals, but also e.g. at various maintenance personnel and the media. The participation of people with disabilities in giving first-hand information on experiences and suggested improvements is of critical importance in training programs.

Another category of training includes the staff working in the public transport sector (see Box 4.1). They should undergo a comprehensive training program to become aware of the needs and user requirements of different disability groups. Staff should also be trained to assist people with disabilities in e.g. transport terminals.

**Box 4.1. Important points to be considered in driver training** (Source: Tom Rickert, Access Exchange International)

The following points provide examples of how to improve safety as well as encourage and assist people with disabilities in using public transport.

- ?? Train drivers to bring vehicles to a full stop when boarding passengers, and to remain at a full stop until disabled and elderly passengers are seated
- ?? Train drivers to remind passengers that certain seats are reserved for disabled and elderly passengers
- ?? Train drivers to call out key stops or, if not possible, to call out key stops and the requested stop when a blind passenger indicates he/she needs this service
- ?? Provide 1-2 hours of sensitivity training annually to each driver, perhaps with a blindfold, or using a wheelchair which a passenger might be able to store if they were to be lifted onto the bus by friends. At such sessions, encourage the top manager(s) or regulatory personnel to also undergo such training as an example to all personnel.

## 4.3 Marketing

The marketing of accessibility includes public awareness campaigns and the promotion of the overall understanding of the situation and needs of different disability groups. The key issue in the marketing process is to guarantee that the information is:

- ?? easy to understand (clear, concise and simple language)
- ?? easily available to the public.

Marketing can be implemented through printed material (pamphlets, brochures, leaflets etc.), publications or audio tapes. The use of mass media is the most efficient way of marketing disability issues and raising public awareness. An effective mass media involvement requires, however, a dissemination plan which ensures that correct information is delivered in the most efficient way, and aimed at the significant target groups, such as government agencies, non-governmental organizations, private sector bodies and individuals, which all cooperate on disability issues and access improvement.

## 4.4 Stakeholders

The responsibility for providing fully accessible facilities and services in the built environment lies jointly with politicians, administrators, urban planners, architects, engineers and builders. As indicated in chapter 4.1, the role of users from various disability groups and the contribution of the supporting organizations are of critical importance in promoting barrier-free movement. The input from stakeholders here does not only include the response of national interest groups, but also the strong support of international organizations. This feedback should be fully considered in decision-making, planning and design processes. Furthermore, the work of various stakeholders also promotes the necessary change in attitudes and greater attention to meeting the needs of people with disabilities.

## 5. Performance Criteria

### 5.1 Data Collection

People with disabilities and elderly persons are the two most disadvantaged social groups. According to the estimation of the United Nations, there were about 300 million people with disabilities only in the Asian and Pacific Region in the middle of the 1990s. According to the European Conference of Ministers of Transport, a share of 10-14 % of the population of most countries in the world have some form of functional limitation which prevents them from using easily or safely all or some forms of transport. Limitation in mobility is partly a function of age and as the number and share of elderly people grow, the number and share of people with disabilities will increase accordingly.

Although data on the number and nature of people with disabilities is becoming more comprehensive, comparisons between countries are still difficult to make. The lack of statistical data on people with disabilities disturbs the planning efforts for promoting accessibility. A reliable database should be constructed, with the help of censuses and surveys, to provide information on the nature and extent of disability issues in developing countries and especially on the situation in rural areas. Available data should be compiled with a goal of eventually setting up unified definitions, which enable comparisons between countries and avoid the duplication of data collection.

Data collection can be further improved by e.g. bringing together social and health workers to develop protocols for extrapolating functional data from existing data. Another approach would be to finance very focused studies describing the situation in urban and rural areas in poorer countries. The focus of these studies would not be on the disability issues, but on the functional issues resulting from disabilities, such as an inability to use public transport.

### 5.2 Evaluation criteria for performance

An evaluation of the accessibility of the environment should include every link in a transport chain. These links include the physical and transport environment, individual transport modes and interchanges between them, and the information needed before and during a trip.

The indicators for evaluating the performance may consist of the following elements (COST 335, 1999):

### **Pre-travel information**

- ?? content of information
- ?? quality of information
- ?? availability of information
- ?? format of information.

### **Access to terminals**

- ?? ease of movement
- ?? pedestrian crossings
- ?? signs.

### **Access between terminals and vehicles**

- ?? stairs, ramps
- ?? lifts
- ?? fixtures, signs
- ?? toilet facilities.

### **Vehicle characteristics**

- ?? doorway access
- ?? gangway access
- ?? seating layout, wheelchair space
- ?? toilet facilities
- ?? lighting
- ?? color contrasts
- ?? on-vehicle information.

### **Personnel**

- ?? availability
- ?? state of knowledge
- ?? level of training.

### **Regulatory framework**

- ?? existence of legislation
- ?? codes of practice / guidance
- ?? maintenance and monitoring standards.

## Economic aspects

- ?? market situation and marketing opportunities
- ?? cost of implementation
- ?? sources of funding
- ?? cost efficiency.

## 6. Financial Issues

### 6.1 Costs of improvements

In this context, it is not possible to provide a comprehensive cost estimate for all the actions required to improve the accessibility of people with disabilities. This is due to the fact that developing countries are at various levels of development with regard to disability issues. However, the different cost components of improving barrier-free movement can be identified combined with some rough cost estimates.

The additional costs of providing adequate accessibility features in the vehicle fleet and rolling stock of public transport differ significantly between designing and building new vehicles as opposed to retro-fitting existing vehicles to meet the demands of enhanced accessibility. According to a rough estimate, the additional cost of building e.g. fully accessible new trains is 5 % at maximum. This additional cost will increase with necessary features, such as accessible toilets for long-distance traffic. Generally, retro-fitting of necessary features is a more expensive solution than including specific features at the design stage. *(For more information on unit costs for various types of accessibility improvements to the infrastructure, see "Guide to Preparing a Municipal Accessibility Plan", edited by Real Patronato de Prevención y de Atención a Personas con Minusvalía, in Madrid).*

The responsibility of access features of transport terminals usually lies with the financier, namely the State government. The major cost element in terminal planning is the provision of level access within terminals, to terminal facilities and vehicles. This cost is considerably lower, if level access is provided with new construction rather than renovating old terminal buildings and facilities.

Additional cost elements in promoting barrier-free movement include the provision of information, training of staff and marketing. These are, however, less significant elements, as they do not specifically consider people with disabilities, but should be provided for all passengers. However, sufficient emphasis on the disability issues will require extra efforts and expenditures. Especially, the training of assistant staff to accompany people with disabilities will add to the total costs.

Many transport services for people with disabilities have been provided through the budgets of social and health administrations. It may be cost-effective to incorporate all the transport services for people with disabilities under one administrative sector, e.g. the transport sector. In practice, this solution cannot be easily implemented and would require a lengthy phase-in period, as trust needs to be developed between the different administrative sectors.

It should also be realized that certain "hidden costs" related to stress, fatigue, accidents etc. exist in the built environments. Furthermore, there are demonstrated cross-sector benefits in promoting transport possibilities for people with disabilities through time and savings of assistant personnel as well as by reductions in the demand for state-funded domiciliary care services and increased employment opportunities for people with mobility disabilities. Moreover, the role of universal design principles in assisting all passengers including people with disabilities can be emphasized.

## 6.2 Implementation

The access policy strategy includes two approaches, which indicate the priority issues in implementation. According to an inclusive approach, the access requirements of the people with disabilities should be included in new infrastructure construction with regard to mobility. This approach guarantees the full consideration of disability issues already in the construction stage and in this way the access requirements can be implemented with significantly lower costs.

The other approach is the reconstruction of existing transport infrastructure, according to which the access requirements of the people with disabilities will be provided for the existing infrastructure. The costs for implementing this approach are considerably higher, but this is probably the only available approach in many circumstances, where basic infrastructure has already been completed and special access requirements must be added to the existing facilities.

The implementation of access policy and legislation is the responsibility of the existing agencies and authorities, which are responsible for building regulations, maintenance of public facilities and different transport systems. Supplementary implementation mechanisms, such as access committees under government agencies, information services or access officers or patrols can be used. Adopting an incentive-disincentive approach (see chapter 2) may be useful in implementing an access policy. Various incentive schemes include e.g. government subsidies, soft loans, tax deductions, preferential treatment in the allotment of new construction as well as awarding of government contracts in the event of satisfactory compliance.

Governments, operators and specialist transport providers should cooperate to develop common organizational and funding structures so that e.g. specialized services, which play an important role for severely disabled persons, will complement accessible public transport services, not substitute them.

Finally, the cooperation between developing countries (south to south cooperation) should be promoted, as they are facing similar problems in similar circumstances with regard to disability issues and can benefit from sharing ideas and making use of common solutions.

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### National-Level Access Legislation and Policy Provisions, Case Study: India <sup>(1)</sup>

#### 1. Current laws and regulations relating to the built environment

##### (a) Building by-laws

These are formulated and implemented by local authorities for application within their respective limits. Each local authority follows the Municipality Act for its area. Building by-laws are essentially based on the National Building Code. They stipulate administrative procedures to regulate building construction activities. Local government authorities have the power to implement and enforce these procedures.

Special building regulations have not yet been formulated for persons with disabilities. Access requirements are not specifically mentioned in building by-laws.

##### (b) The Motor Vehicle Act (MVA)

The MVA is a national regulation covering all road traffic. Access issues are not yet included, but the Committee on Access is in the process of suggesting suitable amendments. The amendments under consideration relate to:

- ?? Specifications for entrance and exit doors, the height of footboards, the width of space between rows of seats;
- ?? Provision for hearing-impaired persons to obtain driving licenses;
- ?? Visual and auditory signals throughout the public transport system; and
- ?? Training for public transport staff and traffic police officers.

#### 2. *The current situation regarding access*

##### (a) Buildings

The access requirements of disabled and elderly persons have only been a consideration for town planners, policy makers, architects, and building developers since 1993. Most public and other buildings in India are not accessible.

It is not common in India for residential buildings to have ramps and lifts. Private builders can, of course, install these but they are deterred by the additional expense. The lower and the middle classes are often housed in units under a Group Housing Project. These generally have two to three storeys with a staircase. Only more affluent members of society can afford lifts, fire alarms and other modifications. Group Housing Project units are generally too small to incorporate alterations, which would improve access.

Almost all rural and some urban areas have hand-operated wells for drinking water. Most wells are surrounded by a muddy bank, making it extremely difficult for persons with

disabilities to use. There are no railings around the wells, so visually-impaired persons have difficulty feeling their way safely towards them.

Elderly and disabled persons in rural areas will have to wait longer than their urban counterparts for their access needs to be realized. Rural residential units constructed by the Government for allocation to the poor are generally built according to standard designs. But units built by private contractors are not subject to building regulations.

Most public and residential buildings in the rural areas are elevated from the ground for drainage and sewerage purposes. Indian-style toilets are the norm in most lower and middle class dwellings. These are not suitable for access by elderly and disabled persons. Public toilets are typically narrow and inaccessible to wheelchair users.

The most common access feature, which has been added to existing public buildings in urban areas, is a ramp at the entrance point. The majority of multi-storey public buildings now have lifts. Multi-storey commercial buildings, market areas and shopping centers usually have moving stairs but no ramps or lifts. Urban public buildings usually have toilets accessible to persons with disabilities and elderly persons.

Most industrial buildings have hooters and bells to raise the alarm in case of a fire. These buildings are not equipped with visual emergency signals for hearing-impaired persons.

#### (b) Public transport

Very few railway stations have ramps and lifts. Visual destination signs are also rare. Large railway stations, bus terminals and airports have public announcement systems, which benefit visually-impaired persons. In local buses, the arrival times are announced through a public address system. There are no Braille information boards in stations and airports.

The Committee on Access has prepared plans for the development of Nizamuddin Railway Station in New Delhi. It will be a model railway station providing all basic access features for disabled and elderly persons. It will provide an example for other similarly busy stations to follow. Similar steps have been taken to improve access in domestic airports. Indian international airports are barrier-free.

Local buses are overcrowded and almost completely inaccessible to a wheelchair user. There are no lifts in buses and usually no ramps at bus stops.

#### (c) Roads and walkways

Urban zones have surfaced roads, but a large number of rural areas do not. In the absence of proper maintenance, surfaced roads become uneven and rough. Mud and sand roads in rural areas are not favorable for elderly and disabled persons.

Pavement height, footpaths, road dividers and speed breakers are not regulated by guidelines or standards. Unauthorized constructions and extensions shrink pavement space. Beggars and homeless persons occupy large areas of walking space.

The covering of gutters, sewers and manholes is mandatory but has not yet been enforced by law. Until enforcement takes place, damages cannot be claimed for accidents.

### **3. Constraints to implementation**

The process of formulation of access legislation and policy provisions has been introduced very recently. It has included the active involvement of disabled persons and local NGOs. The following constraints have been experienced:

- ?? Lack of sensitivity to access issues among policy makers, town planners, architects and engineers;
- ?? Lack of human and financial resources to enforce and monitor such legislation;
- ?? Lack of proper regulation of building construction activities in rural areas;
- ?? Lack of effective enforcement mechanisms for building by-laws; and
- ?? Lack of proper development and maintenance of roads.

### **4. Suggestions for cultivation of awareness of access issues**

It is essential that policy makers, town planners, architects, local officials, professional associations of building developers and educational institutions become sensitive to access concerns. To achieve this, the following measures are proposed:

- ?? Access issues should be projected as matters related not only to disabled persons, but also to all sectors of society. If these issues are projected in isolation of the needs of society at large, they are not likely to occupy national attention. For example, if a ramp for entry into and exit from a building is linked with fire protection, in addition to access, it will perhaps be viewed with greater interest than if it was seen to meet the need of wheelchair users only.
- ?? Access issues should be part of the course requirements for diplomas and degrees in architecture, urban planning, building design, transport and engineering. This will lay a good foundation of trained human resources for improving accessibility.

The Government of India is contemplating modification of its national awards scheme to include an award for the improvement of accessibility. Workshops and seminars to raise awareness of access issues among policy makers, architects and engineers have been organized and will increase.

*(1) Based on a paper by Santosh K. Rungta, General Secretary, National Federation of the Blind, New Delhi, India.*

# The Role of Educations Systems, Case Study: The Philippines <sup>(2)</sup>

## 1. Introduction

The basic knowledge of access issues and design features for promoting non-handicapping environments in the Philippines is widespread in the education system. However, the absence of a leading national or local government agency for implementing and monitoring compliance with accessibility legislation has resulted in a lack of compliance in nearly all educational institutions.

The recent decentralization in the delivery of basic services means that heavy financial burdens and decision-making on construction, repair and renovation of school buildings lie with local government authorities. Financial restraints are central to delays in modifying existing educational buildings.

## 2. Access concerns in the curricula

### (a) Urban planning courses

Very few training institutions concerned with urban planning include access concerns in their courses. If they are included, access concerns are usually integrated into the content of a particular subject, rather than taught as a separate subject.

### (b) Architectural courses

Access concerns are recent introductions in these courses. No institution offers accessibility as a separate subject. Innovative approaches include making accessibility a theme in theses covering design, a topic for special study, or a theme for design contests.

### (c) Interior design courses

No institution currently offers access issues as a separate subject. Some design schools have been considering developing formal access courses to become part of the program of instruction.

### (d) Civil and construction engineering courses

It is generally accepted in the engineering profession that engineers implement designs developed by architects and no more than that. These courses therefore do not include access issues.

### (e) Health/rehabilitation personnel training

These courses include access issues as predominantly medical concerns. Accessibility is included as one of the many aspects of health or rehabilitation, but not as a separate course.

### (f) Traffic/public transport personnel training

Very few institutions offer formal training for traffic or public transport personnel. The level of awareness of accessibility issues and concerns amongst this group is still low. Self-help groups of persons with disabilities have made efforts recently to campaign for the training of such personnel. The same groups have formulated suggestions for and designed modifications to vehicles to improve access to disabled and elderly persons to transport.

*(2) Based on a paper by Angel Lazaro, Jr., Member, Federation of Organizations for Disabled Persons in the Philippines, Quezon City, The Philippines.*

## Accessibility Progress in the “Rio City Project”, Case Study: Brazil<sup>(3)</sup>

Brazil, like other Latin America countries, only recently began giving serious attention to the process of accessibility to the environment and transport aimed at the needs of the population as a whole, of which the elderly, children, pregnant women, and people with disabilities or reduced mobility are a part. Brazil's urban population has grown rapidly in the last five decades and now comprises some 75% of the country's 170 million inhabitants.

The country passed a new, modern Constitution in 1988, legally mandating unrestricted access to the physical environment for all citizens. However, lack of awareness by the population in general and professionals in particular still hinders pro-access activities.

### **Rio City Project begun in 1994**

In 1994, the City of Rio de Janeiro had the opportunity to change a common scenario in Brazil through the Rio City Project, implemented by the City Government and aimed at urban revitalization.

Brazilian cities have undergone massive change over the last 40 years, especially due to heavy automobile traffic. Streets have become unpleasant, dirty, unsafe, hostile to pedestrians, in short, mere thoroughfares between home and work.

As a government program, the Rio City Project soon grew into an ambitious master plan for reconstruction of public areas, including regulation of their usage and activities and improvement of urban standards. The main structural axes in the city were chosen, including the most important thoroughfares in 14 districts, totaling 261 acres of the revitalized area.

A public tender was held for architectural projects aimed at solving common neighborhood problems: chaotic traffic and parking; indiscriminate occupation of sidewalks by street vendors; poor street lighting; pothole-ridden streets causing frequent accidents; run-down public fixtures; and visual pollution. Each stretch or neighborhood was studied by a different architectural firm, with its own autonomous urban renewal proposals.

### **Accessibility needs added due to disability advocacy**

At the time, the Brazilian Institute of Architects and the Rio de Janeiro City Government, pressured by disabled people's organizations, realized that the master plan contained no mention of accessibility, and this demand was subsequently incorporated. Since the City had no previous experience with accessibility, a consultancy relationship was established with the Independent Living Center of Rio de Janeiro (CVI-Rio), a non-governmental organization whose Accessibility Department has accumulated expertise in this field.

This partnership launched a rich experience of transforming a previously inaccessible city. The initial stage of this process lasted three years, from drawing board to construction. During this period the CVI supervised the accessibility projects and advised the architecture firms in their execution through weekly meetings with the teams working on each stretch of the city, daily visits to construction sites, and drafting reports to the City Government.

## **Process based on Universal Design principles**

When the accessibility process was launched in the Rio City Project, the goal was the Universal Design principle: to design with all users in mind, regardless of their physical abilities, based on estimates that over half of the population does not fit the standard stereotyped individual for whom we are accustomed to designing.

It was based on this concept of a broader and less restrictive architecture that we oriented the accessibility project, including some universal solutions like ramps at crosswalks, which serve the purpose for both baby carriages, grocery carts, people carrying weights, and people with difficulty in locomotion, and some special solutions, like texture-coded footways to guide the visually impaired.

## **International expertise gathered on ramps & footpaths**

The goal was to guarantee accessible routes around 560 km<sup>2</sup> of repaved footways. We implemented the requirements for curb ramps at all pedestrian crosswalks, with adequate dimensions and locations. All street fixtures, such as light posts, signposts, litter baskets, benches, and so on were repositioned out of line of pedestrian travel, adjacent to the footways. The equipment was also resized to meet accessibility standards.

From the very beginning, emphasis was placed on signaling for people with visual disabilities using different textures on the footpaths. A CVI paper was drafted to standardize these adjustments to be included in the projects, based on successful experiences in England and Spain, through an information exchange between us and the Royal National Institute for the Blind and Fundación Once, as well as by analysis of international accessibility standards and priorities recommended by members of the Benjamin Constant Institute for visually impaired people in Brazil.

## **Observations on the overall process**

Brazil is a huge and still-developing country immersed in major economic and social problems. In such a context it is often difficult to focus attention on what may sound like sophisticated ideas, like environmental comfort and removal of architectural barriers.

During the Rio City Project we had to deal with the fact that accessibility, a concept and practice widely disseminated in developed countries, is still a recent issue in Brazil, even in large cities. Most Brazilian professionals in civil construction, architecture, and industrial design received no information on this subject during their academic training. Although this tends to seriously hamper assimilation of the concept, in many cases their initial resistance turned into understanding and cooperation.

Hundreds of architects and engineers were dealing for the first time with the issue of eliminating barriers, yet they took a serious and open-minded approach. We had to accept the limitations of adapting an existing city, which is very different from working accessibility into a city's original design. Even so, the project became a benchmark for accessibility in Brazil, visited by professionals from other areas of the country. The success was proven through the post-construction assessment we performed. Disabled people began moving to the city's remodelled areas to live. Everyone prefers the ramps.

## **Phase 2 of the Rio City Project**

Once the entire Rio City Project 1 was completed, in 1997, City Hall initiated Rio City Project 2, for the re-urbanization of 14 more districts, and again CVI was invited to supervise accessibility. This project is still being implemented, but we are already seeing that the work will be easier compared to the first project, beginning with better options for tactile pavements that have started to be fabricated in the country, due to our demand. In Rio City Project 2, the principles of accessibility were much better incorporated, especially by the teams that had participated in the first project.

Accessibility is subject to unceasing dynamics and modifications. No place that has been accessibly remodelled can be considered permanently accessible. External factors interfere constantly and must be monitored. On-going maintenance is necessary to ensure that adaptations and equipment remain whole and efficient. To facilitate such conservation, the community must be encouraged to cooperate. This can only happen through awareness-raising and education.

The success of pro-accessibility efforts thus depends directly on investment in maintenance, publicity, and monitoring.

*(3) Based on a paper by Veronica de Lima Camisão.*

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