Practical solutions for transport access of urban residents with disabilities

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ABSTRACT: Improved mobility is a crucial and necessary element in alleviating poverty throughout the developing world and countries in transition as it can allow those with disabilities to play an active role in society both economically and socially. This paper describes examples of practical but low cost demonstration projects that have been designed and implemented in Pune, India; Maputo, Mozambique; and Blantyre, Malawi as part of a larger research project examining accessibility to public transport for people with disabilities in the developing world. The demonstration projects included improvements to bus shelters, safer street crossings, accessible footways, bus entry and driver training. Prior to and following implementation of the projects both non-disabled and disabled travellers were interviewed in respect of ease of travel. The results, both positive and negative, have been incorporated into the guidelines, which were published in March 2004.

RÉSUMÉ: Rendre les transports collectifs plus accessibles aux personnes handicapées peut transformer de façon significative leur vie dans la mesure ou elle leur permet de prendre part a la vie économique et sociale. L'amélioration de la mobilité est cruciale et nécessaire pour la réduction de la pauvreté dans les pays en développement et en transition.

Cet article est base sur un projet de recherche, en cours, dont l'objectif est de développer un guide pratique pour améliorer la mobilité des personnes handicapées. L'article décrit des exemples peu coûteux mais pratiques, conçues et réalisés à Pune (Indes), Maputo (Mozambique) et au Malawi.

1 INTRODUCTION

Encouraging greater access to transport, including public transport modes, can substantially transform the livelihoods of disabled people themselves and their immediate families. People with disabilities are specifically recognised as a vulnerable population, due to the double penalty of societal discrimination and physical exclusion which often traps them in poverty (DFID, 2000). Improved mobility is a crucial and necessary element in alleviating poverty throughout the developing world and countries in transition as it can allow people with disabilities to play an active role in society both economically and socially.

Inaccessible transport can make it especially difficult for disabled people to find employment, to gain an education and access health care, as well as limit their social and recreational activities. In addition, poverty ensures that disabled people are least likely to be able to afford to live in areas with easy access to social services. Thus, when the need arises disabled people should be able to travel locally or within urban and suburban areas using public transport and other modes with ease. Sadly, however, in the developing world this is the exception rather than the rule.

In some developing countries awareness is growing of the need to gradually remove barriers in the transport environment. The trend is strengthened when stakeholders realise that the same features that benefit people with physical, sensory and cognitive impairments also benefit many other travellers, including small traders with pushcarts, pregnant women and older people. Slow progress is partly caused by funding constraints, but also by a lack of good practice which means that where features are

included they are not always appropriate to the needs of travellers. For example, in some countries kerb ramps have been installed to provide easy access to footpaths, yet many are non-functional due to steep slopes, or barriers such as garbage bins or street vendors who set up stalls and sell vegetables and fruits on the pavements.

2 DESCRIPTION OF RESEARCH PROJECT

This paper is based on a three-year research programme funded by the UK Department for International Development (DFID) that aims to provide a compendium of guidelines and good practice for improving access to transport and hence reducing mobility barriers of disabled people in developing countries. Although basic problems faced by disabled travellers are similar across the world, access solutions cannot simply be transplanted from developed to developing countries as, clearly, priorities, resources, and operating conditions vary greatly. The research utilises principles of universal design to improve access to the pedestrian and public transport systems for all users.

The research therefore included three demonstration projects aimed at testing specific interventions under local conditions. The projects were selected in consultation with local stakeholders to represent a range of options, but had to be low-cost and appropriate to local constraints. Demonstration projects were designed and implemented by local project partners in Pune (India), Maputo (Mozambique), and Blantyre (Malawi) during 2003.

Demonstration projects can often be criticised as providing short-term interventions that eventually fall apart without sustainable funding. It was therefore important to address issues of continuity through involvement of local stakeholders. Demonstration projects can be useful for raising public awareness around issues for which there would otherwise be a lack of funding; and for demonstrating and testing good practice under local conditions.

Each demonstration project was evaluated to determine whether low cost solutions aimed at improving accessibility for disabled people could improve ease of travel for all passengers and pedestrians (both disabled and non-disabled).

3 PRINCIPLES OF GOOD ACCESS

During earlier phases of the research, project teams in India, Malawi and Mozambique conducted focus groups and workshops to identify and understand the problems faced by disabled people and their companions when attempting to travel. Some of the salient findings were reported at CODATU X (Venter et al, 2002).

Problems were found to be similar in all three countries and comprised the following barriers:

- *Social barriers* (including high cost, lack of disability awareness, and communication difficulties);
- *Psychological barriers* (such as fear for personal safety); and
- *Structural barriers* (including infrastructure, operations and information barriers).

Most of these barriers are interrelated, and ultimately need to be addressed in an integrated manner. For instance, lack of amplified announcements of public transport information in a rail station may be compensated for somewhat by the presence of well-trained and pro-active staff, which would also help to reduce psychological barriers against travelling.

While the specific solutions to the above mentioned barriers vary from place to place and country to country, experience across the world has shown that good access practice has four essential elements in common (Figure 1). Spelling the acronym "**SARA**", they are: **S**afety, **A**ccessibility, **R**eliability, and **A**ffordability. *Unsafe* conditions both deter vulnerable users, and contribute to further injury and disability. *Accessibility* requires that services be designed and operated with a wide range of physical, sensory and mental abilities in mind. *Reliability* of services and assistive devices has proven to be extremely important to vulnerable travellers. Access solutions need to be *affordable*, both to the user (who is often poor) and to the provider, to be sustainable in the long run.

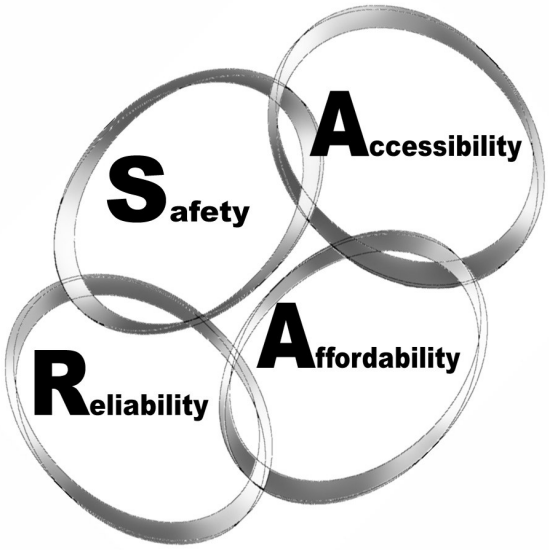

Figure 1: Basic principles of good access

In line with this reasoning, each of the demonstration projects incorporated all four of the SARA elements. The short timeframe of the project dictated that emphasis be placed on alleviating structural barriers, but social aims were indirectly pursued through enhancing public awareness around the projects themselves.

4 DEMONSTRATION PROJECT SITES

The three locations selected for the implementation of low-cost access solutions were:

Pune:
Route number 5 operated by Pune Municipal Transport (PMT): The entire bus route was selected to test the integration of bus stop infrastructure and driver awareness in operation. The route itself passes through an extremely busy corridor of the city and connects the railway station with Swargate bus interchange, an area having considerable commercial, cultural and historical relevance. The route is short (just 6 kilometers long) and follows very narrow roads along certain portions of the route. It is also extremely congested in terms of cars, motorcycles and trucks. It has a very high passenger demand comprising school children, students, shoppers and employees travelling to/from work. In addition there are a high number of passengers with disabilities.

The existing bus shelters were in a poor state of repair and offered very little comfort or accessibility. Any improvement would provide considerable benefit to all passengers and provide evidence to the PMT management to continue upgrading the comfort and accessibility of bus stands throughout the bus network.

Maputo:
Pedestrian environment and bus entry on Eduardo Mondlane Avenue: On a busy public transport route (used by buses and minibus-taxis) down a multi-lane arterial in Maputo, this site is used by workers, as well as visitors and patients of a nearby hospital. The road crossing is inaccessible and unsafe due to high kerbs and a wide (22.5 meters) cross-section. The municipal buses stopping here have very high steps (up to 45cm to the first step) and no grabrails, making it very difficult for all passengers – and especially those with mobility impairments – to board and alight.

Blantyre:
Entrance to Queen Elizabeth Central Hospital: The entrance to the hospital is situated on a busy main road, and was considered unsafe and inaccessible for pedestrians and minibus users. During peak times about 600 people use the site per hour. The bus shelter used by minibus passengers (and others seeking shelter) was small and inaccessible, while the pathway connecting the bus stop with the hospital entrance was unpaved, making it very difficult for people with walking difficulties to use, especially during the rainy season. Where people cross the road between the two bus stops, there was no pedestrian crossing despite high traffic volumes and speeds.

The fact that both the Blantyre and Maputo sites included hospital entrances is an outcome of the goal of maximising the use of the facilities by disabled people, given current travel patterns and reflects the priorities of stakeholders. It does not mean to suggest that non-medical trips are less worthy of full access; indeed improved livelihoods for disabled people requires access to a full range of activities and services.

5 PRACTICAL ACCESS SOLUTIONS

5.1 Bus shelters

Several low-cost improvements to the design of existing bus shelters in Pune rendered them more accessible and safer for all to use (Figures 2 and 3). Improvements included:

- widening entrances into the shelter to at least 1 metre;
- increasing the height of benches to a height of 600mm to be usable by all passengers;
- providing large print route information signs in the shelter; and
- removing barriers in or near the shelter which hinder movement or could injure users.

Passenger surveys demonstrated a higher usage of the bus shelters and higher levels of comfort after the changes were made. A total of 69% of

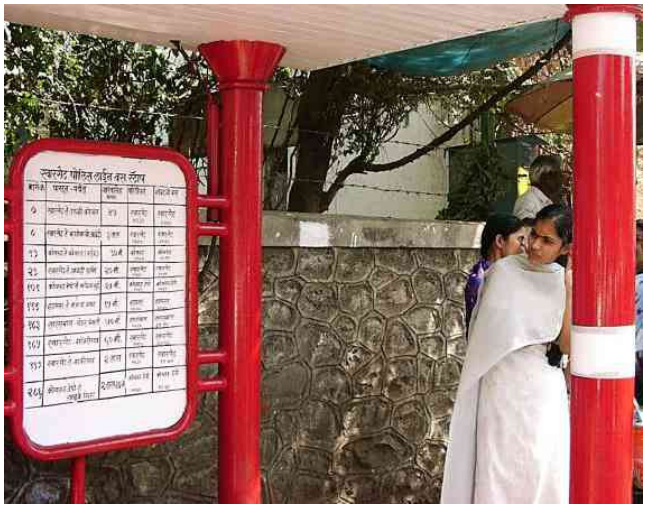

Figure 2: Large print route information at bus stop, Pune

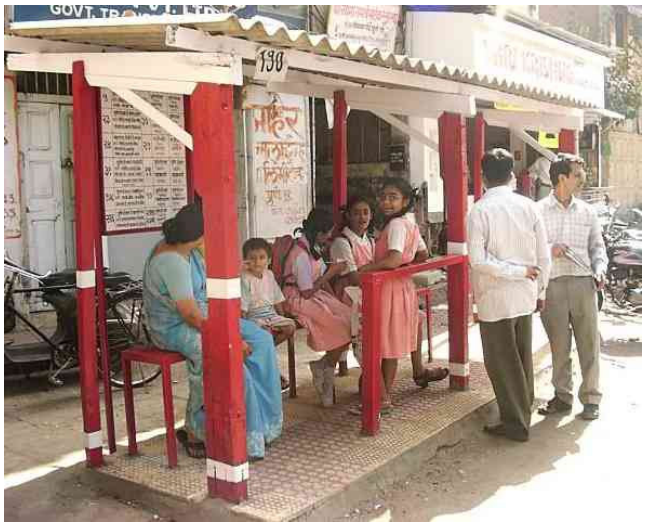

Figure 3: Upgraded bus stop, Pune

passengers found the bus shelters "comfortable" or "very comfortable" after the project compared to just 19% prior to the bus stand enhancement. Interestingly, more females than males felt the bus stands had become more comfortable. The surveys highlighted the importance of driver training to ensure that passengers using bus shelters are given sufficient time to board the bus and increase passenger confidence in their usefulness.

In terms of information adequacy and clarity 50% found the information provided at bus stands after the demonstration project had been implemented to be "very clear" compared to just 4% before the project. The information boards were found particularly helpful to hearing impaired passengers who valued the independence it provided them. However, some passengers wanted the information boards to be illuminated at night. "*It is all very nice and useful during daytime but during night we cannot get benefit of these boards and also it would indeed be nice if they were illuminated," said one interviewee.*

5.2 Safer street crossings

Safety at street crossings is a major problem at both the Maputo and Blantyre locations. People with disabilities often need more time to cross, which can lead to either long waiting times or conflicts when they do not have crossing priority. The two sites represent two levels of intervention, depending on the resources available:

- Installation of traffic signals giving pedestrians absolute priority. In Blantyre a push button-activated signal with a beeping sound was installed to maximise its use to visually impaired pedestrians.
- Where the high cost of signalisation cannot be justified in terms of pedestrian volumes, unsignalised crossings can be made safer by clear pavement markings (as was the case in Maputo) and warning signs to motorists.

In both cases, additional accessibility was provided by installing kerb ramps (dropped kerbs) (Figure 4) to enable wheelchair users and others with for instance goods carts to use the crossing. Follow-up observations confirmed that both treatments were effective in improving safety and accessibility at the crossings, despite the low road user discipline of motorists. In Maputo, the percentage of disabled and elderly pedestrians using the formal crossing rather than jaywalking increased drastically from 13% to 73%. Additional measures to reduce vehicle speeds, such as appropriately used traffic calming, would benefit vulnerable pedestrians even more at such locations.

Figure 4: Kerb ramp at street crossing, Maputo

5.3 Accessible footways

Improving footpaths and pavements (sidewalks) should be an early priority for enhancing mobility, as walking is the major mode for many (especially poor and marginalized) people, and some of the more expensive interventions (such as improving buses) are meaningless unless people can get to and from the vehicle. Accordingly, footway improvements in Maputo and Blantyre included (Figure 5):

- paving heavily used footways with a durable material such as concrete;
- installing kerb ramps with a 1:12 maximum gradient at level changes to provide access to all users;

Figure 5: Upgraded footway with tactile path, Blantyre

- installing tactile markings on the path at hazardous locations or along the length of the path as a guidance path (where high numbers of visually impaired pedestrians use it); and
- painting a pathway to delineate the space to be used by pedestrians, in order to limit encroachment by vendors.

In both locales the improved footways were appreciated by disabled and non-disabled pedestrians. The vendor-free paths were generally honoured by vendors, even though they were not enforced and were meant more as a guide. In Blantyre, some visually impaired people highlighted the need to keep the pathway swept and clean to keep the tactile guideway functional. If a guidance path is used on a pavement it must be installed correctly to give clear, correct information to the user. Visually impaired people also need to be trained on the meaning and correct use of the surface.

5.4 Bus entry

In order to reduce the problems that people – and especially people with walking difficulties – have in boarding the high-floor buses used in Maputo, small kerbside platforms were erected on both sides of the road at a major bus stop (Figure 6). If used correctly, the platforms more than halve the height to the first step of the bus. Although in the long run a far better solution is to replace the existing bus fleet with more accessible and user-friendly designed buses, this was not considered feasible within the scope of the project. Low-cost boarding platforms can be cost-effective as they serve many vehicles stopping at the same location.

Introduction of the platforms was coupled with sensitisation of bus drivers on the goals of the project and use of the platforms. Initial observations confirmed that they made boarding considerably easier and that passengers were willing to use them. About 20% of elderly and (ambulatory) disabled people chose to board the bus from the platform. The sample included virtually no wheelchair users as the existing bus fleet is not wheelchair accessible.

The solution did not however prove to be sustainable. Observations two months later showed the use of the platforms to be virtually nil – a situation driven by a number of factors. Bus drivers were prevented from consistently stopping close to the platforms, by the interference of informal taxis using the same stop in a very disorganised manner. Bus drivers stop for a very short time, causing passengers to have to run to catch the bus, and thus being disadvantaged by waiting on the platform rather than beside it. Under these circumstances the combination of unregulated operation by competing vehicles, undisciplined driver behaviour, and undemanding passsengers ultimately made this type of infrastructure-based solution inadequate and ineffective.

In contrast, incremental improvements made to vehicles in Pune, India, proved to be more successful. The upgrading of bus shelters in Pune coincided with the introduction by PMT of buses with more accessible designs. The research team working with the PMT management suggested a number of improvements that could be introduced and these included wider entrances, lower first steps, colour contrasted entry and exit steps, dedicated seats for disabled passengers, grabrails and stanchions throughout the bus and lights illuminating the entry steps at night (Figure 7). In addition, a bell and light were installed for passengers to be aware that the bus would be stopping at the next stop. The percentage of passengers who described boarding the bus as “difficult” or “very difficult” decreased from 65% to

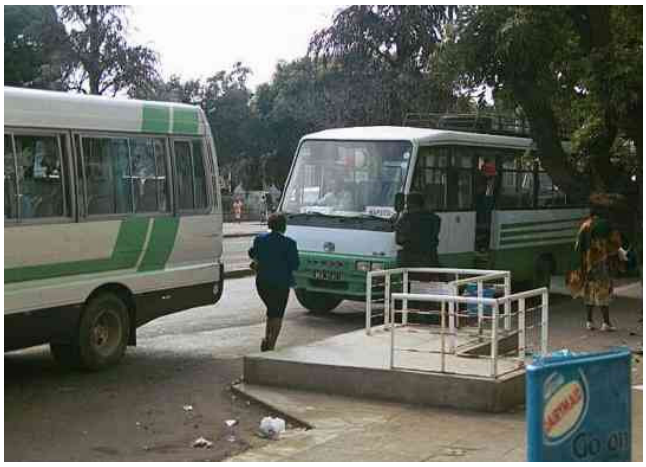

Figure 6: Minibuses blocking boarding platform, Maputo

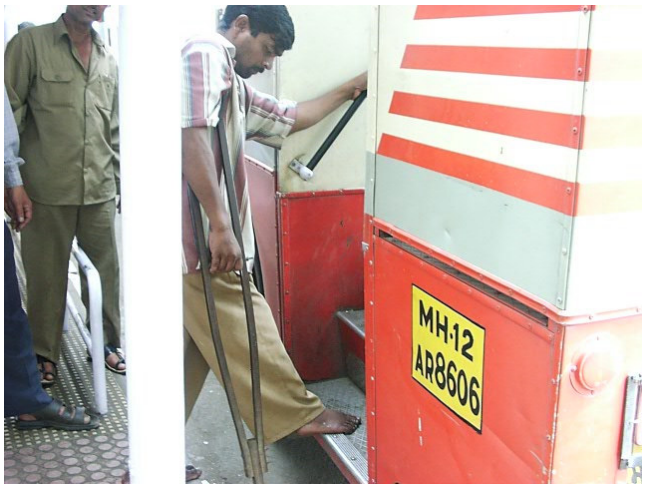

Figure 7: Easier boarding from bus stop into buses with lower first step, Pune

20% following the introduction of the new buses. One passenger was quoted as saying "*I suffer from mild arthritis and these new buses are slightly easier to board*".

5.5 Driver training

After introducing better bus designs, PMT had organised a sensitisation programme for its drivers and conductors. All staff underwent the training which was implemented with the help of various groups of disabled people who were able to identify for staff the problems and constraints encountered when travelling by PMT buses. Following the training the percentage of passengers interviewed who graded staff attitude as impolite or unhelpful decreased from about 60% to about 20%. Interestingly, bus staff were observed to be more helpful towards visually impaired passengers than towards hearing impaired passengers. Conductors often forgot that hearing impaired passengers cannot hear if a bus name is shouted out or a bell is rung hence the need for a light activated stop and possibly elementary sign language to be taught to conductors. Evidently public awareness of the different needs of passengers with different disabilities varies greatly. Clearly training needs to reflect such requirements and to be undertaken with refresher courses periodically.

6 CONCLUSIONS

The results show that low cost accessibility solutions can be effective and beneficial. However there is a need to involve all local stakeholders to ensure that they "buy" into the projects. In India the time was opportune as disability issues were already receiving considerable media attention following a legal case. In addition, the new incoming General Manager of PMT was previously the Disability Commissioner for Maharashtra State. These factors provided the catalyst for improvements to be tried and tested. In Maputo and Blantyre this was not the case but the local City Council representatives and transport officials were very receptive and keen to introduce improvements.

The demonstration projects were evaluated to determine whether the changes improved ease of travel and safety for passengers or pedestrians. At each of the demonstration sites there was no evidence of an increased tendency to travel – but this was never an objective of the project. Travel involves a whole chain – including walking to and from a public transport stop, boarding and alighting a vehicle, and in-vehicle travel – and incremental improvements should be seen as a necessary part of removing major barriers that will eventually enhance people's mobility. What is clearly evident is that **all** passengers gain from even minor improvements to the transport chain, not just disabled travellers, so that it is a "*win win*" situation.

Not all solutions tried were effective or self-sustaining. Findings from the demonstration projects enriched the guidelines that were the major output of the research project. The guidelines will be published and available by CODATU 11, or can be accessed at *www.transport-links.org*.

7 ACKNOWLEDGEMENTS

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