

TOWARDS IMPROVING THE ACCESSIBILITY OF COMMUTER RAIL TO SPECIAL NEEDS PASSENGERS

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ABSTRACT

In keeping with the rest of the world, the specific needs of passengers with disabilities, the young and the elderly were not always considered when the commuter rail networks were constructed in South Africa and rolling stock purchased. Common physical barriers include access to station buildings, use of facilities, access onto the platforms and trains and lack of dedicated spaces on the train in which to travel safely and with dignity.

The South African Rail Commuter Corporation (SARCC) acknowledged the accessibility requirements of passengers with special needs during 2001 and undertook to incorporate these requirements into the planning and provision of commuter rail services so as to make the system fully accessible over the longer term to all its passengers.

This paper describes the draft national policy that was developed by the SARCC to guide the implementation of these requirements based upon the concepts of providing a Total Service and Universal Design principles.

1. INTRODUCTION

Commuter train services operate in South Africa's main urban areas, namely Johannesburg/Pretoria, Cape Town, Durban, East London and Port Elizabeth. The assets (rail infrastructure, stations and trains) are owned by the SARCC with the operations of the services contracted to Metrorail. The services carry 2.1 million passengers daily which represents almost 20% of the public transport market share. The networks had their origins in Cape Town in the 1860's with the latest passenger railway line being constructed in 1989. The rolling stock comprises 1950's technology which is slowly being refurbished under a limited funding program. The last new commuter rail rolling stock was acquired in the mid-1980's.

In keeping with the rest of the world, the specific needs of passengers with disabilities, the young and the elderly were not considered when the networks were constructed and rolling stock purchased. Common physical barriers include access to station buildings, use of station facilities, movement through the ticket control gates, access onto the platforms, boarding the train and lack of dedicated spaces on the train in which to travel safely and with dignity. Two examples of these barriers are shown in Figures 1 and 2.



Figure 1. Access to platforms is generally by steps.



Figure 2. The gap between the platform and train prevents “level access”.

Things are, however, changing. South Africa’s progressive Constitution, written in 1996, proclaims that:

“The State may not unfairly discriminate directly or indirectly against anyone on one or more grounds, including race, gender, sex, pregnancy, age, disability”

and that:

“everyone has inherent dignity and the right to have their dignity respected and protected”.

Given these proclamations, and other legislation, the SARCC identified the need for a national policy to be developed to guide the process of improving the accessibility of the commuter rail system to passengers with special needs.

2. SPECIAL NEEDS PASSENGERS

Drawing upon similar definitions elsewhere in the world, the South African National Department of Transport ⁽¹⁾ identified the following groups of passengers as those with special mobility needs:

(a) *Life Cycle Passengers*: These are passengers who have special transport needs by virtue of the fact that they happen to be in normal stages of the human life cycle. Examples would include children 5 – 14 years old for whom transport is particularly unsafe or who need special assistance in using the transport systems; women during the final stages of pregnancy; the elderly who, as a result of age-related impairments, require special assistance, security and access;

(b) *Impairment Passengers*: These are passengers with physical or intellectual impairments for whom special assistance, adapted technologies and special safety requirements are necessary; and

(c) *Signage Passengers*: These are passengers who for reasons of illiteracy or lack of familiarity with the language of signage are unable to access enough information to use the transport system effectively.

An estimate of the number of Life Cycle and Impairment Passengers living in South Africa is given in Table 1. It is based upon data obtained by Census 2001 in which a disability was defined to be an impairment “which has lasted for six months or more, or is expected to last at least six months, which prevents the person from carrying out daily activities

independently, or from participating fully in educational, economic or social activities”.

Table 1. Estimation of the number of life cycle and impairment passengers within South Africa.

Special Needs Passenger Category		South Africa
(a)	Life Cycle Passengers	
	Children (between 5 and 14)	9 915 472
	Pregnant women (2 months only)	Not known
	Elderly (aged 65 and above)	2 215 211
		12 130 683
(b)	Impairment Passengers	
	Sight (serious eye defects)	577 096
	Communication	75 454
	Hearing	313 585
	Physical (eg paralysis)	557 512
	Intellectual	206 451
	Emotional	268 713
	Multiple	257 170
		2 255 981
(c)	Signage Passengers	Unknown

Source: Census '01

The table shows that there are more than 14.3 million potential Special Needs Passengers in the country which represents 32% of the total population.

3. DEVELOPMENT OF A DRAFT NATIONAL SPECIAL NEEDS PASSENGER POLICY FOR COMMUTER RAIL

In 2001, the SARCC acknowledged the mobility requirements of passengers with special needs and undertook to incorporate these requirements into the planning and provision of its rail infrastructure, facilities, rolling stock and service improvements so as to make its system fully accessible over the longer term to all of its passengers⁽²⁾.

A draft national special needs passenger policy was developed to guide the implementation of these requirements.

The policy comprised:

- Policy statement in which the requirements of passengers with special needs is acknowledged and fundamental premises of the policy recorded; and
- Principles underlying the policy statement.

The fundamental premises included that:

- A passenger with special needs is fit to travel independently on a journey given that the transport system is able to cater for that passenger's special mobility needs; and
- A Special Needs Passenger should be able to enjoy the same ease of access, comfort and dignity as any other passenger.

The policy promotes the concept of a “*Total Service*” being provided to all passengers by which every passenger is provided with all the components that they require to make their journey with ease of access, comfort and dignity. This can be achieved within the commuter rail system through the provision of:

- Fully accessible station facilities;
- Level access from the platforms to rolling stock;
- Fully accessible rolling stock;

supported by:

- Appropriately trained assistance from the service providers; and
- The availability of accessible active and passive information systems and message content

and encapsulated within the prevailing rail operational environment.

As such, the policy requires that the accessibility of three dimensions of the commuter rail system be addressed as shown in Figure 3; namely, the level of:

- Infrastructure facilities
- Assistance from the service providers
- Information provided by the communication systems/message content

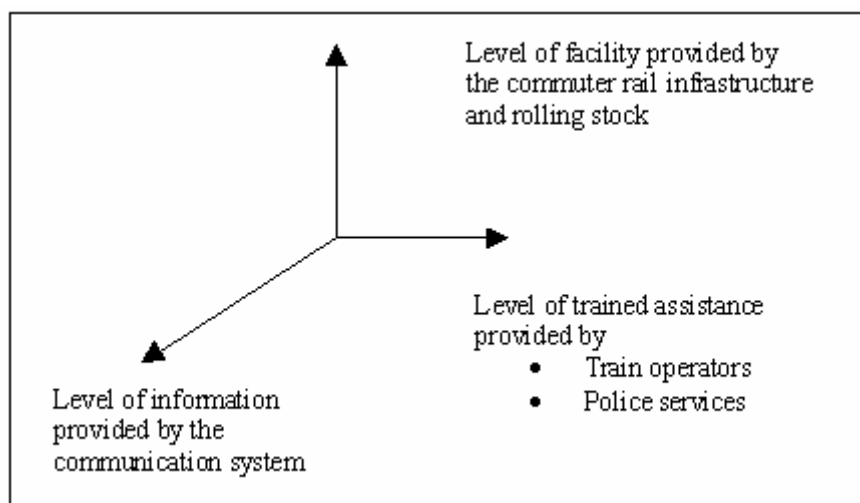


Figure 3. The Three Dimensions of Total Service within the Rail Operational Environment (Train Scheduling and Deployment).

The level of facility has been addressed by developing a four level grading system:

- Level 0 indicates that the facility is not suitable for use by a particular group of passengers;
- Level 1 indicates that the facility is suitable for use by a particular group of passengers but has some restrictions and/or assistance is required;
- Level 2 indicates that the facility is suitable for use by a particular group; and
- Level 3 indicates that it is suitable for use by all passengers.

Negotiations are under way with the National and Provincial Department's of Transport regarding the development of a suite of training programs and material. It is intended that this is generically based so as to address the training functions related to Special Needs Passengers of the wider public transport requirements.

Research into the information requirements of specific categories of special needs passengers is progressing. It is anticipated that this will assist in determining the level of information, of both systems and material content, that will be required to support this dimension of Total Service.

The policy further requires implementation plans to be developed for each commuter rail operating area.

The plans that have been developed so far provide for:

- Improvements to the existing commuter rail system being implemented incrementally on a Priority Network for Special Needs Passengers that comprises priority corridors (and key stations on those corridors) and key regional stations on the remaining network, with an on-going implementation programme eventually leading to universal access of the entire commuter rail system; and
- New infrastructure provision to be planned and designed in accordance with the principles of universal accessibility and be implemented as an accessible facility for all Special Needs Passengers irrespective of whether or not it is located on the Priority Network for Special Needs Passengers.

4. PRINCIPLES OF UNIVERSAL DESIGN

The concept of “*Universal Design*” was developed in the early 1980’s in Canada and the United States of America by occupational therapists and architects associated with creating independent living facilities for people with disabilities.

The term is used to describe the philosophy of designing all products and the built environment to be aesthetically pleasing and usable, to the greatest extent possible, by everyone, regardless of their age, ability or status in life. It was coined by Ron Mace, who later became an internationally recognised architect, product designer and educator. He left his legacy in the form of The Centre for Universal Design at North Carolina State University. This body⁽³⁾ defined Universal Design to be:

“The design of products and environments to be usable by all people, to the greatest extent possible, without adoption or specialised design.”

Seven key principles were identified by The Centre. These principles, together with guidelines on their usage, are reproduced in Table 2. Some examples are given in Figures 4 and 5.



Figure 4. Example of equitable use – ramp and stairs are useful to people with diverse disabilities.



Figure 5. Example of simple and intuitive use – the user chooses to use the escalator, stairs or stairs/handrails based on their own needs.

Table 2. Principles of universal design and guidelines for their use.

No	Principle	Guideline for use
1	Equitable use – the design is useful and marketable to people with diverse abilities.	a) Provide the same means of use for all users: identical whenever possible; equivalent when not. b) Avoid segregating or stigmatizing any users. c) Provisions of privacy, security, and safety should be equally available to all users. d) Make the design appealing to all users.
2	Flexibility in Use – the design accommodates a wide range of individual preferences and ability.	a) Provide choice in methods of use. b) Accommodate right or left-handed access and use. c) Facilitate the user's accuracy and precision. d) Provide adaptability to the user's pace.
3	Simple and Intuitive Use – use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.	a) Eliminate unnecessary complexity. b) Be consistent with user expectations and intuition. c) Accommodate a wide range of literacy and language skills. d) Arrange information consistent with its importance. e) Provide effective prompting and feedback during and after task completion.
4	Perceptible Information – the design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.	a) Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information. b) Provide adequate contrast between essential information and its surrounds. c) Maximize "legibility" of essential information. d) Differentiate elements in ways that can be described (ie make it easy to give instructions or directions) e) Provide compatibility with a variety of techniques or devices used by people with sensory limitations.
5	Tolerance for Error – the design minimises hazards and the adverse consequences of accidental or unintended actions.	a) Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded. b) Provide warnings of hazards and errors. c) Provide fail safe features. d) Discourage unconscious action in tasks that require vigilance.
6	Low Physical Effort – the design can be used efficiently and comfortably and with a minimum of fatigue.	a) Allow user to maintain a neutral body position. b) Use reasonable operating forces. c) Minimise repetitive actions. d) Minimise sustained physical effort.
7	Size and Space for Approach and Use – approximate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.	a) Provide a clear line of sight to important elements for any seated or standing user. b) Make reach to all components comfortable for any seated or standing user. c) Accommodate variations in hand and grip size. d) Provide adequate space for the use of assertive devices or personal assistance.

Source: The Principles of Universal Design, 1997, NC State University, The Center for Universal Design.

5. PACKAGES OF INTERVENTIONS

Status quo assessments of the accessibility of the rail systems were made in the four major commuter rail operating areas. Adequacy gaps were then identified in the system by comparing the status quo against best practices as determined from literature searches, correspondence with rail operators in other countries, interaction with groups of people with disabilities and observations during visits overseas.

Once the gaps were known, packages of interventions were devised that can be implemented both in the short and long term. The purpose of the short term interventions is to produce immediate improvements to the system at low costs. Improvements with higher costs are to be introduced in the longer term.

The four packages are:

- *Package One*
Low cost, high impact interventions to improve the accessibility of passenger information, station facilities, bridging the gap between platform and trains (with assistance) and rolling stock.
- *Package Two*
Provision of automated, real-time, passenger information at stations, platforms and on-board trains.
- *Package Three*
Removing barriers encountered in changing levels between floors of a station, access to the platform and unassisted access to trains.
- *Package Four*
Provision of universal access throughout the commuter rail system.

The key improvements within each package are shown in Table 3 at the end of this paper.

6. TIMEFRAMES FOR IMPLEMENTATION OF PACKAGES

Timeframes for the implementation of the four intervention packages were devised based upon the current programme for the general overhaul and refurbishment of the trains. This is because the improvements to the accessibility of the trains should only be made, for practical and economic reasons, when the trains are removed from daily use for programmed general overall or refurbishment. Also, for infrastructure improvements to be utilised to their best affect, they need to be serviced by accessible trains.

Typical timeframes for the first three packages are shown in Table 4.

Table 4. Typical timeframes for implementation of intervention packages.

Package	Timeframe (years)	
	Start	Final
1	0	15
2	5	20
3	15	30

No timeframe is given for Package Four (provision of unassisted universal access throughout the system) as this will require replacement of all trains with new rolling stock. Such action is currently financially unrealistic.

7. PUTTING WORDS INTO PRACTICE

Two opportunities to put words into practice presented themselves recently in Cape Town. The first opportunity followed the decision by the Provincial Government to relocate a major hospital providing specialised care for patients with disabilities. This necessitated the

upgrading of the public transport system servicing the relocated hospital. Work at these two stations is in progress. The second opportunity was identified in two new railway stations forming part of the Khayelitsha line extension. These two stations are being planned, designed and will be constructed using Universal Design principles based upon international best practice.

In addition to these two opportunities, SARCC and the Provincial Government are finalising a partnership agreement to remodel some 30 key stations in the Western Cape over the next 5 years.

8. ACKNOWLEDGEMENT

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9. REFERENCES

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- [2] South African Rail Commuter Corporation (2003) *Special Needs Passengers: Policy for Commuter Rail in South Africa: Final Report*. SARCC, South Africa.
- [3] North Carolina State University (1997). *The Centre for Universal Design*.

Table 3. Key contents of the four implementation packages.

Package	Passenger information	Station facilities	Bridging the gap between platform and train	Rolling stock
1	<p>Raise awareness that travel is possible by commuter rail.</p> <p>Make trained staff available to provide assistance if required throughout the journey (including at telephone call centres).</p> <p>Make available information giving pre-travel notification of the accessibility of the route to be traveled.</p> <p>Improve location and wayfinding signage, including signage that is accessible to partially signed and blind passengers.</p> <p>Provide in-travel static displays of scheduled services and fares.</p> <p>Provide an emergency help communication system at stations and on platforms (connects to office at station).</p> <p>Provide an emergency help device to the driver/guard on-board train.</p> <p>Ensure the use of the existing public address system to announce the destination of the next train arriving at a platform and now standing at a platform (can also be announced by a guard with a loud hailer).</p> <p>Provide a manually operated public address system on-board trains (for future upgrade to automated systems).</p>	<p>Make entrances and exits accessible at stations.</p> <p>Provide unobstructed passages on floor of entrance hall and concourses.</p> <p>Make ticket offices accessible to all Special Needs Passengers.</p> <p>Provide by-pass channel at access control for passengers with mobility aids.</p> <p>Provide accessible toilets.</p> <p>Provide accessible waiting areas on platforms.</p> <p>Install lifts in existing shafts at key stations.</p> <p>Provide tactile strip as warning to the edge of platform.</p> <p>Provide accessible emergency exits from stations (excluding island platforms).</p>	<p>Aids for passengers who are not in wheelchairs to bridge the gap eg:</p> <ul style="list-style-type: none"> - improved grab rails at doorways which are accessible from the platform - contrasting sill - easily recognisable door locations - ensure that the train stops consistently at the same place on the platform - increased dwell time at station <p>Interim aids for passengers who are in wheelchairs to bridge the gap, eg:</p> <ul style="list-style-type: none"> - Manually operated ramp stored on each platform with partial level correction of platforms where necessary 	<p>Improved grab rails at doorways to assist boarding and alighting.</p> <p>Contrasting sill.</p> <p>Easily recognisable door location.</p> <p>Emergency door releases that are palm operated.</p> <p>Visual and audible warnings of doors opening/closing.</p> <p>Contrasting flooring at doorways.</p> <p>Manually operated public address system (for future upgrade to automated system).</p> <p>Emergency communication device to the driver/guard.</p> <p>Priority seating for Special Needs Passengers.</p> <p>Space for a passenger in a wheelchair.</p>
2	<p>Expand the provision of automated public address and visual display systems at stations and on platforms (including upgrade to communication infrastructure).</p> <p>Provide automated public address and visual display systems on-board trains.</p>	-	-	<p>Provide an automated public address and visual display system (upgrade of manual public address system – requires automated systems at stations to be in place).</p>
3		<p>Provide unobstructed passage between floors of entrance hall and concourse.</p> <p>Provide a combination of means to change level to and from platforms.</p>	<p>Partially raised platforms and bridging plate/automated ramp on-board train</p>	<p>Increased aisle width in coaches with transverse seating.</p> <p>Improved lighting in coaches with longitudinal seating.</p>
4	<p>Provide universally accessible passenger information throughout the commuter rail journey.</p>	<p>Provide universally accessible facilities at all stations.</p>	<p>Provide “level access” from all platforms to all trains</p>	<p>Provide universally accessible rolling stock on all services.</p>