

THE MYCITI IRT SYSTEM IN CAPE TOWN: A CASE STUDY IN ADHESIVE TACTILE WAY FINDING

S SMIT* and G DAVIES**

*HHO Africa, t +27 (21) 425 2870, f +27 (21) 419 4689, susan@hho.co.za

**Disability Solutions, t +27 (21) 872 1101, f +27 (21) 872 9675, info@disabilitysolutions.co.za

ABSTRACT

Integrated Rapid Transit systems are designed for the needs of the customers. A world class facility would therefore allow for the convenience and safety of all users, including those reliant on universal accessibility and the provision of information other than that provided in the visual medium.

MyCITI, the Integrated Rapid Transit (IRT) system currently being implemented in Cape Town, is a case study in the conceptual design, construction and implementation of various elements of universal accessibility, passenger information and way finding. The system draws from international examples and expertise in finding appropriate local interpretations in infrastructure design and construction to deliver a system that can offer public transport to all users.

This paper provides a summary of the concept development and implementation strategies currently underway to supplement the universal accessibility and tactile way finding associated with the Cape Town IRT System infrastructure with specifically designed adhesive tactile way finding panels for the public transport users with visual impairments or language barriers.

BACKGROUND

The US Department of Education (2001) defines way finding as spatial problem solving. Way finding furthermore refers to techniques used by people with visual impairments to move from place to place independently and safely, and is typically divided into two categories: orientation and mobility. Orientation concerns the ability for one to monitor his or her position in relationship to the environment; and the mobility refers to one's ability to travel safely, detecting and avoiding obstacles and other potential hazards.

Three different environments are identified for way finding: internal, external and in a vehicle. External environments refer to the uncontrolled space when a journey is conducted outdoors. This would include the journey stages of walking, and catching a bus from a bus stop. The external environment is classified as an uncontrolled space and therefore does not include a closed / controlled environment even if it has an external area. (RNIB Innovation Unit, 2010)

PROBLEM STATEMENT

Bus rapid transit (BRT) is focused on moving passengers through a series of public spaces that are safe and accessible to all. If any element of a journey can be considered unsafe, this may deter individuals from making the entire journey. This statement refers to the legibility of the physical environment in which the individual user finds themselves, as well as the knowledge readily available to familiarise the users with the system.

The design of pedestrian environments is considered paramount to the acceptance of a newly introduced IRT system or the continued growth in the ridership of an existing system. This design process orders the urban environment associated with the BRT system to draw the user to the station and stops. The urban environment offers many opportunities to focus the sighted user's route to and from the BRT infrastructure. Way finding for BRT systems may rely on sign posting and colour or texture related information drawing the eye towards the branding at stations or stops. This family of way finding information is however not readily accessible to the visually impaired user of a BRT system.

In general, the available examples of tactile way finding or information provided specifically for people with visual impairment in the South African context, have been developed for use within buildings or applied to entrance ways leading to and from buildings. The provision of way finding information leading people with visual impairment to public transport facilities has a number of challenges as this journey is not generally restricted to the built environment.

AIM OF PAPER

This paper provides an overview of the design and implementation process that lead to the application of tactile way finding to compliment the directional way finding designed for the MyCITI IRT System currently implemented in Cape Town. The initiative contributes not only to the legibility of the MyCITI system, but recognises the needs of minorities in this, the United Nations Decade of Action for Road Safety 2011-2020.

CONCEPT DESIGN PROCESS

The Accessible Transport Strategy for the London 2012 Olympic and Paralympic Games (2008) states that inclusive improvements to public transport systems are often funded as part of infrastructure investment associated with mega events, such as the 2012 London Olympics. This report emphasises that accessible real-time information is widely used on public transport in developed cities, but is often considered expensive and not available in the wider urban context. The use of more pictograms in way finding and information signs is advised to assist users when navigating their way around public transport systems.

The Olympic Delivery Authority in their manual on Inclusive Design Standards states that it is imperative that all signage around the Olympic Park and other venues associated with the mega-events hosted, be consistent and complimentary to the environment in which it is applied. This manual explains that by addressing the needs of special needs visitors and users, the signage systems applied will become more user-friendly to all. Visually impaired individuals and people with language and learning difficulties require signs to be designed in a specific way, and this manual provides basic guidelines on the possible design tools to be used.

It is explained that way finding used to navigate unfamiliar environments should not rely exclusively on text based signage, but should rather be designed to include colour, simple symbols or pictograms and careful language. The designs should provide identification and confirmation as well as directional information.

The design and implementation of infrastructure associated with the MyCITI IRT System in Cape Town is historically linked to the construction of the Cape Town Stadium Precinct and the Green Point Urban Park in time and through the knowledge applied by professionals working on all three projects. When designing the non-motorised transport and way finding infrastructure the design engineers built on the international best practice contributed by the way finding and accessibility professionals responsible for these elements of the Stadium construction.

The tactile way finding implemented at Cape Town Stadium Precinct provides directional information to the various areas in the immediate vicinity of the Stadium such as parking areas and the various entrances to the Stadium. This way finding concept was also introduced on the podium levels of the Stadium. The tactile information maps applied to bollards with the Green Point Urban Park guide people with visual impairments through this demarcated environment around the Stadium. The design details of these directional signs and information maps are equally accessible to sighted users, due to the use of internationally recognisable symbols rather than tactile language or signs targeted at the sight impaired only. The use of international symbols also reduces language barriers often associated with written signage.



Figures 1a, b & c: **Tactile way finding application at Cape Town Stadium** (Photographs by Susan Smit & Angela Gilbert)

As a result of the severe time constraints in the period leading up to the inaugural events at Cape Town Stadium, the professional team were not allowed an opportunity to test the way finding signage used at the Stadium before the first events. Despite this, the team have received several favourable comments from users during and after the events hosted at the Stadium.

The conceptual design of the tactile way finding for the MyCITI System was adapted for application in a wider urban streetscape, with the specific goal of guiding sight impaired users to the BRT stations and stops. The tactile way finding was intended to compliment the directional way finding the infrastructure team designed and implemented along pedestrian routes leading users from a distance of approximately 500m to the MyCITI System stations. International best practice was followed when designing these pedestrian routes through the installation of tactile paving, dropped kerbs and on-demand audible

pedestrian push-button traffic signals at intersections. Specific attention was given to major pedestrian routes leading to the public transport facilities and the MyCITI stations.



Figures 2a & b: Audible pedestrian push button traffic signals and tactile pavers used for the MyCITI System, Cape Town (Photographs by Pierre Smit & Susan Smit)

The way finding directional signs consist of the name of the MyCITI station and the distance to that specific station applied to a metal sign board or finger positioned on a galvanised pole pointed in the direction of the station. The way finding information is displayed in 40mm white lettering or 120mm symbols on a 150mm x 950mm background in the contrasting blue colour associated with the MyCITI branding. The way finding directional signs are made more recognisable by the application of a red band at the top of the pole in a colour matching the MyCITI branding. Up to 14 directional way finding signs are placed within the area around each MyCITI station.

The standard directional sign poles have a diameter of 110mm and a circumference of 345mm. The positioning of the poles offer the opportunity to display way finding fingers in 4 directions. The concept of applying tactile information to sign poles (as seen at Cape Town Stadium) was simplified to a adhesive tactile panel rather than the raised bandage used at the Stadium. The size of the pole therefore allowed for tactile information displayed on four individual adhesive panels each with a width of 85mm. This dimension was suitable to the signs or pictograms required, making this design an acceptable alternative to the raised bandages at the Stadium. This design was also found to be more cost effective, and therefore better suited to a larger number of applications in the extended urban environment along the entire MyCITI System route.



a



b

Figures 3a & b: **Directional way finding signs for the MyCITI System, Cape Town** (Photographs by Randall Woods)

The signs are produced using a UV-flatbed digital print process where silicon-based ink is repeatedly applied to create product with tactile differentiation. This technology allows for great flexibility in the design process as any variety of images or colours or tactile levels can be produced. This repetitive printing process delivers a nearly tamper-proof surface. The application on adhesive panels allows the product to be used on a wide variety of surfaces and the weather resistant properties of the silicon-based ink makes this product ideal for exterior use for a period of up to 7 years.

It is important to take local circumstances into account when adapting international best practice for local implementation. Although Braille is widely used on accessible signage in developing countries, this is less appropriate in the South African context where the education in and use of Braille within disabled communities is vastly reduced, in comparative terms. The tactile pictograms used in this application are, furthermore, inherently more inclusive than Braille, as it allows a much larger user group than only individuals able to access Braille.

Tactile way finding signs need to provide only the vital information in a consistent and completely accessible manner without contributing to information over-load or environmental clutter. The adhesive tactile panels must correspond to the information and direction of the way finding fingers.

The pertinent information guiding users to the MyCITI stations could be limited to symbols for a bus, the direction to take to reach this bus station and the distance to this station. Although the width of the adhesive sign was guided by the circumference of a standard pole, the height of the adhesive panels was decided by the need for only three symbols displaying the required vital information.

Once the initial concept was presented to the client and the relevant representatives from the local authority, design development could proceed through engagement with iterative feedback from representatives of the sight impaired community. The engagement process focussed on organisations which represent people with visual and other impairments. The anonymity of the individual respondents has been respected throughout the process.

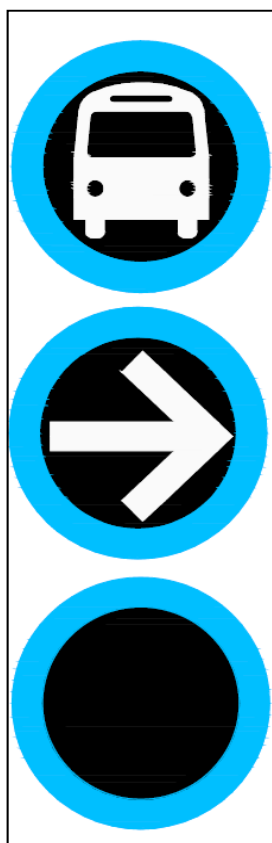
The engagement process was based in informal discussion, as a direct response to the urgency of the implementation process, the time implications of formal feedback systems

and the preferences of the commenting individuals. Due to the limited roll out of the tactile way finding adhesive panels at this time, the sample size and the engagement process was limited. Once the adhesive panels are located along the public transport routes, a greater live test of the implemented system will be possible. This text can be expanded to include people with visual, cognitive and neurological impairments.

The original adhesive panels were designed to a width of 85mm and a height of 274mm to accommodate 3 circular images with a diameter of 82mm each. The images consists of a pictogram of a bus, a directional arrow and a distance indication to the nearest BRT station, all printed in relief and contracting colours similar to the MyCITI branding.

FEEDBACK PROCESS

The design team produced a series of tactile examples. Each example was presented to the panel with an explanation of the future use and application if the tactile adhesives, and the feedback recorded. After giving the description, the interviewer made every attempt not to lead the discussion, but merely to answer any direct questions relating to them. In particular it was essential not to lead the discussion, but to allow each individual to comment freely. Initially, it was found that the respondents had to be encouraged to be critical. The initial design was well received for its apparent benefits to the sight impaired community, and the respondents appeared unwilling to be critical of a design that was unique in South Africa (with the exception of Cape Town Stadium).



All feedback was reported to the design team, and this was used to further improve, and alter the design. Each iteration underwent this process, leading to the final design. The initial design examples were directly affected by comments received and the response to the comments can be summarised as follows:

- Several respondents noted that the original symbol for the bus could be confused with that used to indicate a minibus taxi. This bus symbol was amended in the latest design examples to conform to the image for a bus.
- A number of respondents commented that the original shape of the arrow was 'slightly confusing' as the arrow head had similar dimensions to that of the overall shaft of the arrow. Although the respondents felt that this would not create difficulty as users became accustomed to the symbols, the design team reduced the dimensions of the arrow head and this was met approval by the respondents.

Figure 4: Illustration of the initial tactile panel design presented to the respondents

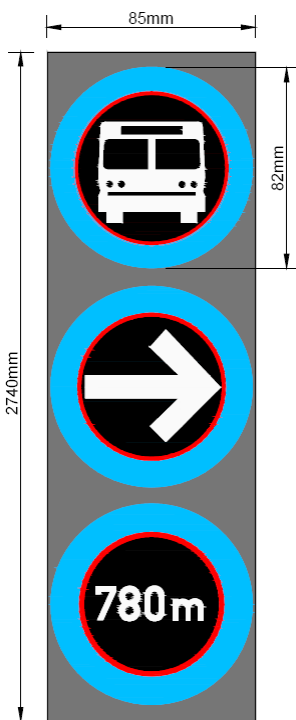
- It was recorded that the 'tactile nature of the actual symbols is not enough'. The design team produced a further example on which the degree of tactile distinction was increased from 2 levels to 3 levels. The tactile differentiation on the adhesive panel was now more pronounced and legibility was increased.

- The respondents appreciated the use of contrasting colours in the initial example, but indicated the further benefits of introducing additional contrasting colours to the display. This was noted by several users, who, while registered as blind do retain some limited sight. In response, the design team added a red colour band to each

of the circles encasing the information symbols. The red band reflects the painted colour band at the top of the directional way finding pole and compliments the MyCiTi branding further.

- Final comments were made on the installation of the adhesive tactile panels. The placement of the panels is considered critical to their overall benefit.

Subsequent to the recorded feedback from the representatives of the sight impaired community and the changes made by the design team summarised above, a final example was produced and returned for sign off. The final design incorporated the following elements, in direct response to the comments summarised above:



- The pictogram to represent the bus is a slightly different one, to distinguish it from the similar pictograms used for mini-bus taxis.
- The process of making the signs allowed for the various elements to be raised by 50%, giving greater definition.
- A contrasting red stripe, which matches the branding colours of MyCiTi System, has been introduced into the design.
- The location of the signage has been discussed in some detail. Further engagement should occur once the signage has been positioned, to garner further feedback, and to explain and educate, various key members and stakeholders from within the disabled community. There has to be consistency and precision in the location of this signage.

Figure 5: Illustration of the final tactile panel design presented to the respondents

This iterative engagement process is still considered unusual and the sight impaired community have limited experience in contributing in this manner to an infrastructure design process. The concept of adhesive tactile way finding signage is also new and does not allow for any degree of comparison to simplify the engagement process.

The iterative engagement process is, however, still considered vital to the design of accessible way finding signs. It has also allowed the disability sector to engage, and comment in a positive manner. This engagement can now be carried through to the implementation phase of the design, and finally through to the education of the users. If the lessons learned during the design process can be carried through to the implementation and education processes, the adhesive tactile way finding signs will have the full impact conceptualised by the design team.

IMPLEMENTATION PROCESS

Client sign off was reached based on the positive feedback from the iterative process described, the contribution to the accessibility of the MyCITI System and the limited cost involved with the implementation of the adhesive tactile way finding signs. Contract instructions are currently being issued in the form of design drawings and a matrix containing the information required on each panel and the details of the corresponding directional way finding pole on which each panel will be applied. The design team will offer continued support to the contractor during the production and installation of the panels to deal with the challenges of implementing this unusual concept in signage.

Although the adhesive tactile way finding signs were designed to be applied to the directional way finding poles planted within the 500m area around MyCITI stations, this design could equally be adapted for use on other surfaces or in relation to other civic amenities or places of public interest. This application as part of the BRT project should be considered a starting point only, with the potential to be rolled out in a general urban environment and thereby creating a complete way finding system. The consistency of design and use should, however, be adhered to as ad hoc applications will detract from the benefits of the simplified and uniform tactile information system.

As with the design development, the practical installation must be recorded to assist in periodical review and improvements to the concept. This record will form the base information for the education process targeted at sight impaired users. Although the adhesive tactile panels will benefit users across language barriers, the sight impaired community should be the target of the education process, as other users will have the benefit of existing visual references when navigating the urban environment around the MyCITI stations and stops.

The technology used in the design and production of the adhesive tactile way finding panels may now be used to develop further applications such as area maps use for orientation purposes at the entrance to MyCITI stations or within the larger public transport facilities where the scale and complexity of the facilities require guidance to the impaired user.

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