

Bus route and destination displays

Making it easier to read





Visual impairment and accessibility

Serious non-correctable sight impairments affect 1.97 million people nationally in the UK. The majority of people with visual impairments have some visual ability, with the level of visual acuity ranging from person to person.

The visual abilities of people, in general, tend to deteriorate with age. Macular degeneration is the most common cause of sight loss in people over 60. One in every three British adults is already over 50. It is estimated that by the year 2025 close to 20% of the UK adult population will be aged 65 or over. The number of people with reduced vision is therefore likely to increase over the next decade.

People with low vision, rely on public transport to get around. Clear route and destination displays are essential to making bus use easier for those people.





Improving bus travel



To enhance bus use for all passengers an inclusive approach to information provision needs to be adopted. To this end research was undertaken to identify improvements to display design which would be of benefit to all passengers. Members of the public participated in the research including people with a range of visual impairments including Macular Degeneration, Glaucoma, Retinitis Pigmentosa and Cataracts. The different forms of display technology were assessed under day and night conditions in terms of reading distances, reading time and viewing angles as well as participant opinions.

To improve bus travel, it was found that:

- ¥ Buses need to be readily distinguishable from other vehicles.
- ¥ The route and destination information needs to be free from the clutter of surrounding advertising and graphics.
- ¥ The design of the displays needs to minimise the effects of glare and reflection.
- ¥ Display information should be readable when the bus is approaching from a distance as well as when stationary at the stop.
- ¥ For approaching vehicles, additional methods for conveying display information are required since a display of sufficient size to be read by passengers with a visual impairment cannot be accommodated on the front of the vehicle. Such methods may include: audio information or real time passenger information systems provided at the stop.





Improving readability

The following design principles were identified from the research:

- ¥ The route number and final destination should be as large a font size as possible.
- ¥ Intermediate place names should only be used where they do not detract from the optimum provision of the route number and final destination.
- ¥ The route number should be to the right of the display and the final destination should be displayed below the route number.
- ¥ Text should have a high colour and luminance contrast with the background.
- ¥ The use of upper-case only should not be used. Text should be in title-case, this is the use of lower-case characters with the initial character in upper-case as required.
- ¥ Broad bold, square-like character typefaces employing conventional dropped descenders should be used i.e. the tails of characters such as g and y should extend below the line of the text.
- ¥ Displays should be located immediately behind the display window aperture. Otherwise for recessed displays, text to the right of the display may be obscured from kerbside passengers.
- ¥ Display misalignment should be eliminated.
- ¥ Advertising and graphics should be avoided in areas around the display.
- ¥ It was also noted that side displays were particularly valued by the participants who had visual impairments.
- ¥ More generally the research found that the clarity of flip-dot and LED displays needs to be improved particularly when viewed close up from side and low viewing angles. Increased display resolution, improved LED angularity and re-orientation of the display itself may assist this.



Display technologies

Printed Display Technology



Colwick 008

Printed display technologies consist of solid letters that are printed onto a display background. Conventionally a series of displays were printed onto a continuous sheet that was put onto a roller that was turned until the required destination appeared in the display aperture. More recent methods for conveying printed text have included boards attached to a rotating drum that is turned until the correct board is sited within the display aperture.

Flip Dot Display Technology

City Loop 9

Flip dot or light reflecting systems consist of a matrix of circular, square or rectangular elements that are reflective on one side and matt black on the other. Electromagnetic current rotates the elements to display either the black or reflective side, with the reflective elements forming to create the letters and therefore the content of the sign. The most common colour of the reflective side is yellow. A flip dot display can be programmed with many different configurations enabling vehicles to be used flexibly across different routes.



LED Display Technology

Edwalton 6A

Light emitting systems use light emitting diodes (LEDs) that emit light when activated or form the background of the sign when not activated. Like the flip-dot display, an LED display can be programmed with many different configurations enabling flexible use across different routes.



Display performance

Printed (Fluorescent yellow on black)	Flip-Dot (Fluorescent yellow on black)	LED (Amber on black)
<ul style="list-style-type: none"> ¥ Oldest display technology ¥ Good letter clarity close up ¥ Can be read at greater angles of view than flip dot and LED displays ¥ Visible in strong sunlight ¥ Can be changed at the push of a button without leaving the cab (For motorised versions of printed blinds only) 	<ul style="list-style-type: none"> ¥ Good letter clarity at a distance ¥ Visible in strong sunlight ¥ Can be used flexibly across routes (easy to change content of the display) ¥ Character space within display can be used flexibly ¥ Can be changed at the push of a button without leaving the cab ¥ Lower maintenance requirements than manually wound printed blinds 	<ul style="list-style-type: none"> ¥ Most recent display technology ¥ Good letter clarity at a distance ¥ Can be read at greater distances than printed and flip dot displays ¥ Achieves high colour contrast ¥ Can adapt brightness to ambient lighting conditions ¥ Can be used flexibly across routes (easy to change content of the display) ¥ Character space within display can be used flexibly ¥ Can be changed at the push of a button without leaving the cab ¥ Lower maintenance requirements than manually wound printed blinds

