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chapter 13 Facilities for Mobility Impaired People

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13.1 Introduction

In Great Britain surveys carried out by the UK Office of Population, Censuses and Surveys (OPCS) during the 1980s showed that 142 people per 1000 of population, aged 16 and over had some form of physical, sensory or mobility handicap. One in ten adults had some form of locomotive handicap.

When account is taken of adults accompanied by small children, those encumbered by shopping, those temporarily slowed down by illness or pregnancy, and frail elderly people, around 1 in 6 adults are mobility impaired in some way. The most common mobility impaired person is an adult pushing a buggy

With respect to sight impairment, around 1 in 60 are blind or partially sighted people, 5% of whom have no sight at all. Sight impairment includes limited field of vision, loss of central vision, acute short-sightedness, uncontrollable oscillations of the eyeball, and night blindness.

Many blind people use a white cane to detect obstructions and changes in level, for example a kerb or step. Some use a guide dog that has been trained to guide the person around obstructions and stop at changes of level.

Access and road safety was investigated in a study carried out by TRL in the UK.[1] This study looked at accidents involving visually impaired people using public transport or walking and was questionnaire based (UK police and Irish An Garda Siochana accident report forms do not record whether a pedestrian was visually impaired).

The main results of the study were:

- 29% have been involved in an accident whilst crossing the road
- Of those involved in accidents, 11% were at pelicans, 6% at zebras, 8% at traffic lights, and 75% at no designated crossing point
- 11% of those involved in accidents were told it was safe to cross by another road user and were then struck by a vehicle

Wheelchair users having problem with kerb upstands

It is clear from the mobility statistics that large numbers of particularly vulnerable people are potential road users, mostly pedestrians. These form a significant minority of the population and their needs should be taken into account in the design, construction and maintenance of the road network.

Loss of sight, hearing and mobility poses great problems for affected road users. Kerb upstands can be trip hazards for pedestrians and cause access problems for wheelchair users. Flush kerbs are desirable but can cause problems for sight impaired pedestrians who may be unable to detect them and may inadvertently walk into a dangerous situation such as live traffic. The provision of appropriate tactile paving and other indicators can greatly help these road users. However, tactile indicators are sometimes incorrect or missing. This chapter gives guidance on the use of such tactile devices together with further references and contacts.

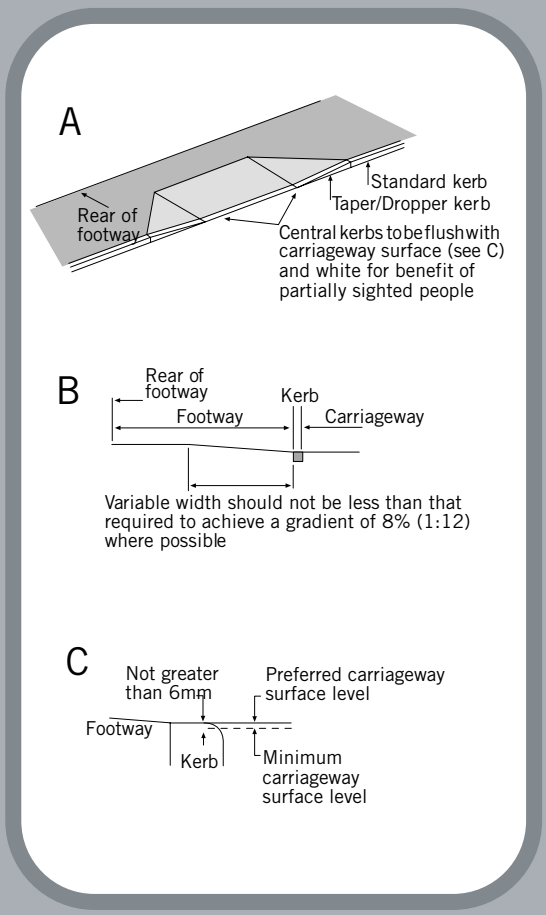
13.2 Design, construction and maintenance issues

The way that footways and crossings are designed, constructed and maintained will have a major impact on how safely these vulnerable road users can travel. Good design can encourage use. Poor or misleading design may be dangerous, and can discourage people with mobility impairment from travelling independently. This can lead to them becoming more excluded from the rest of society. People with sight impairment require guidance to safe crossing points like zebras and pelicans, and warning of hazards such as dropped kerbs and cycle tracks. People in wheelchairs and persons pushing buggies require smooth low gradient transitions between the footway and road at crossing points. Both road user groups require uncluttered footways free of obstructions with sufficient width to pass any potential obstructions and other pedestrians. Providing mobility/sensory impaired people with good facilities need not be expensive, it is often about getting the detail right.

Barriers and hazards to mobility/sensory impaired road users include:

- insufficient footpath width (especially on islands in staggered crossings)

Diagram 13.1 Dished Crossing



- absence of dished crossings. These should be provided at both controlled and uncontrolled crossing points
- poorly designed or constructed dished crossings with excessive ramp slope or significant kerb upstand. A ramp slope of 1 in 20 is desirable with a maximum of 1 in 12. The kerb should be flush with the road surface or have a maximum upstand of 6mm (see Diagram 13.1)
- trip hazards such as kerb upstands, sunken chamber covers, cracked or loose paving
- absence of tactile indicators at controlled crossing points (see 13.3). Tactile paving, tactile push button units and audible bleepers should be incorporated into crossings. The push button units should be located on the right hand side within 500mm of the crossing lines so that vision impaired people can easily locate them.
- obstruction of the footway by parked cars, advertising boards and street furniture such as litter bins, bollards, sign posts, signal poles etc
- inadequate illumination of potential hazards. High-pressure sodium lighting provides a better quality of light and can improve colour definition and crime deterrence. Lamp columns should be located at the rear of footways so as not to cause obstruction. Mounting the lamp units on walls can be considered in appropriate areas

Cranked signal poles allow push buttons to be sited close to the crossing and provide clearance from passing vehicles without obstructing the footway

Advertising board blocking footway

13.3 Tactile paving

Tactile paving is used to provide information to vision impaired people. It can be used either to guide them to specific features or warn of potential hazards. Tactile paving provides a colour contrast to standard footway and road surfaces. Tactile paving units also have a variety of surface textures to help vision impaired people differentiate between the facilities which it guides them to, or warns them of.

Tactile paving (blister surface) is most often used to guide vision impaired people to a controlled crossing facility. This can also be used to provide a warning at locations where there is a kerb upstand of 25mm or less (for example footway crossings, and traffic islands). Without the paving, vision impaired people may find it difficult to determine where the footway ends and the road begins at such locations and could therefore trip or inadvertently walk out onto the road.

Other forms of tactile paving can be used to guide vision impaired pedestrians through a particular area, for example a pedestrianised street. It can also be used to provide warning on segregated cycle tracks and footways, steps, and at bus, train and tram stops. Further information on these uses is available in "Guidance on the use of tactile paving surfaces".[2]

The paving units are laid in a variety of configurations to suit the location or type of facilities. Layouts should be simple, logical and consistent. A clear colour contrast between the paving and the footway is important. The quality of lighting at points where tactile paving is used is also important. Poor quality lighting and certain types of lighting such as low-pressure sodium lights can make colour differentiation more difficult for the visually impaired. High-pressure sodium lighting provides better colour differentiation.

Controlled crossings (see also Chapter 12)

Red tactile paving units only should be used at signal controlled crossings and zebra crossings to guide vision impaired people to the crossing point. The paving units should be laid in an L-shape as shown in Diagram 13.2 (See also Table 13.1)

In order to do this the stem of the paving should be extended to the back of the footway to intercept people who might otherwise walk past the facility. The stem should be 1200mm (3 slabs) wide.

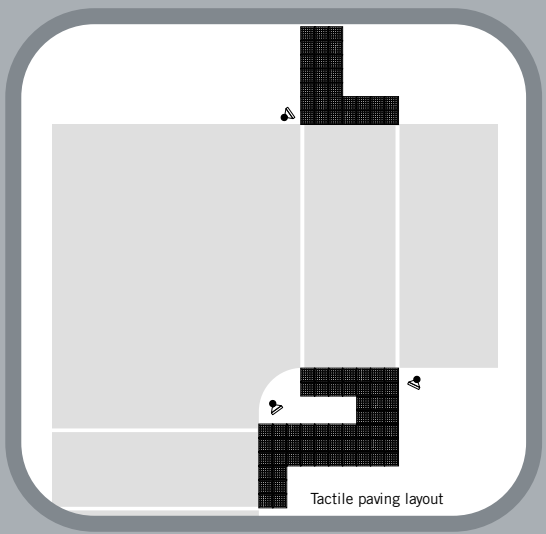
At the crossing point, the tactile paving should be laid across the full width of the dropped kerb (but not the taper kerbs). This should be a minimum of 2.4m wide and should be 800mm (2 slabs) deep. This may require some cutting of the paving units to ensure that they are correctly orientated. The 'dimples' on the tactile paving units should be aligned so as to guide vision impaired pedestrians directly to the other side of the crossing.

Crossings should be perpendicular to the road (where possible) and provide the safest and most direct route. Crossing points should always be dished.

Blind person at crossing

Tactile paving slabs

Diagram 13.2 Layout at signal junction with pedestrian phase



The top of the dropped kerb at the crossing should be painted white for the benefit of partially sighted pedestrians. Chamber and inspection covers should be located outside the crossing and its approaches where possible. If this is unavoidable, the tactile paving units should be laid into recessed covers to maintain the consistency of paving (see Picture 13.6). Signal controlled junctions without a pedestrian stage should be treated as uncontrolled crossings.

Treatment of traffic islands and staggered arrangements at controlled crossings

If a traffic island is not intended as an area for pedestrians to wait then tactile paving should not be used at the island. An example of this would be at a controlled crossing point with a splitter island where the signal sequence allows pedestrians to cross the whole width of a road at once.

At locations where a traffic island is provided to allow pedestrians to cross a road in two (or more) parts then tactile paving should be provided. If the island is 2m wide or less, then the tactile surface should continue all the way across it (see Diagram 13.4). If the island is greater than 2 wide, then a gap should be left between adjacent strips of tactile paving (see Diagram 13.5). It may be necessary to cut the paving units to fit the available space.

If a crossing is staggered then the layout should be as shown in Diagram 13.6.

Uncontrolled crossings

The layout and colour of the tactile paving at uncontrolled crossing points are different to those for controlled crossing facilities. This is because the purpose of the tactile paving is to warn vision impaired pedestrians that there is a reduced kerb upstand (less than 25mm) at the edge of the road (and prevent them inadvertently walking out into the road) rather than guide them to a safe crossing point.

Diagram 13.3 Layout at zebra crossing

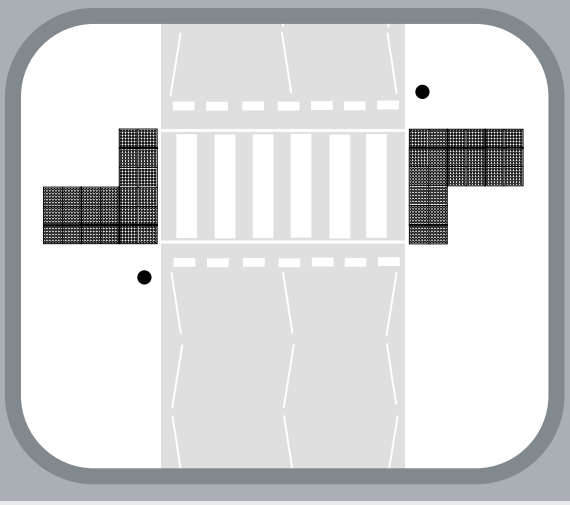


Diagram 13.4 Layout at traffic island 2m wide or less

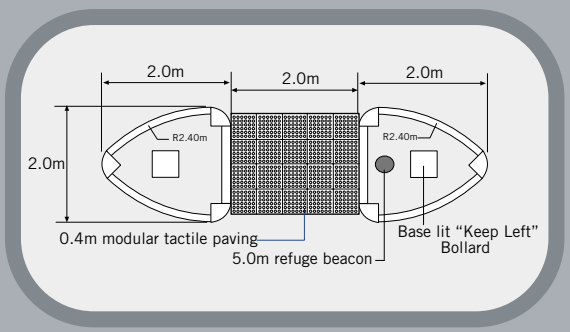
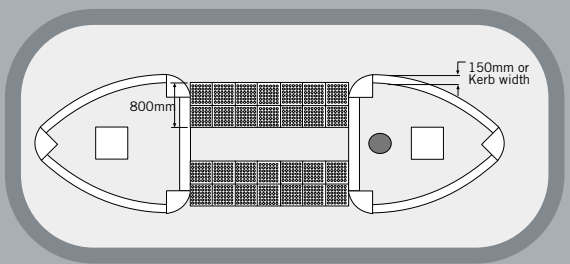


Diagram 13.5 Layout at traffic island greater than 2m wide



Grey or buff tactile paving should be used but with no "stems" at the following locations:

- raised entry treatments
- speed tables
- traffic islands
- dished crossings
- dished crossings at traffic signals without a pedestrian stage

However, it may not be possible to provide tactile paving at all existing locations and therefore the provision of such facilities may need to be prioritised. In deciding relative priorities, discussions should be held with local groups representing both vision impaired and restricted mobility (such as wheelchair users) pedestrians. Tactile paving should be provided at the locations listed above where new works are being constructed.

Table 13.1 summarises the main points of the use of tactile paving. Further details are given in "Guidance on the use of tactile paving surfaces[2]"

Diagram 13.6 Layout at staggered crossing

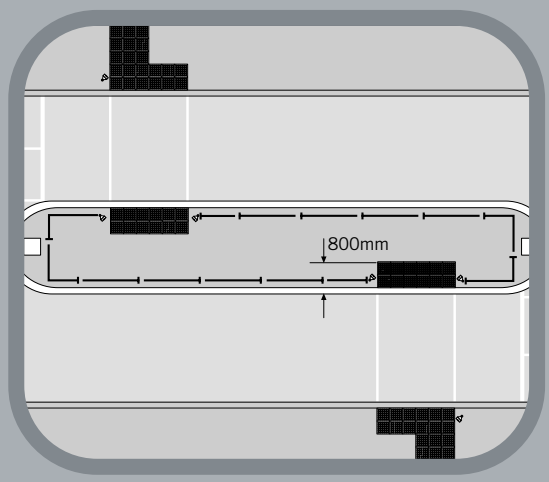
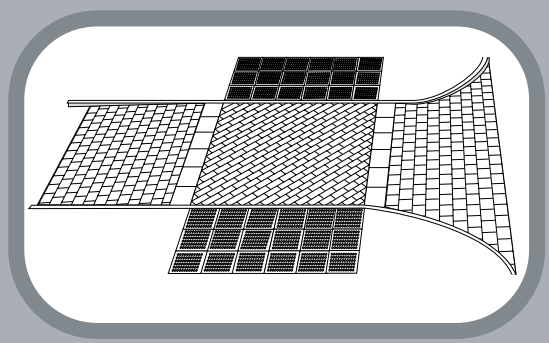


Diagram 13.7 Layout for raised entry treatment at a junction



13.4 Audible and tactile devices for controlled crossings

At signal controlled crossings, audible bleepers emitting a pulsed tone are normally used during the pedestrian green period. There are two types of push button unit in common use (see Chapter 10.3 – push buttons).

However, there are difficulties using audible signals in the following situations:

- at a staggered crossing facility with each side having independent operation
- at traffic signals with split pedestrian phases (operating on a "walk with traffic" basis)

It may be difficult for the vision impaired or people with hearing deficiencies to establish exactly which crossing movement the audible signal applies to. This could lead to pedestrians stepping into live traffic. "Bleep and sweep" crossings have been used in these circumstances. These produce separate distinctive tones and the audible range is restricted to minimise any potential confusion.

Audible bleepers may cause noise intrusion in residential areas and in such cases the bleeper can be turned down or if necessary switched off overnight. However ambient sensitive noise units are recommended for these locations. Where an audible signal cannot be used, an alternative tactile indicator should be used (see Chapter 10.3 – push buttons).

13.5 Basic design dimensions

Facilities should be designed to accommodate all road users expected to use the facilities where possible. The following basic dimensions are required by different groups of pedestrians and cyclists:

- a wheelchair requires a length of 1140mm - 1500mm and has a passage width of 900mm
- a wheelchair plus a person pushing requires a length of 1750mm and has a passage width of 900mm
- an adult plus a guide dog requires a length of 1500mm and has a passage width of 1100mm
- a pushchair plus a person pushing requires a length of 1900mm and requires a passage width of 670mm–1100mm

Further information and advice on improving facilities for the mobility impaired is given in "Reducing Mobility Handicaps[3]".

TABLE 13.1 DETAILS OF TACTILE LAYOUTS AT CROSSING POINTS

Use	Colour	Shape	Width of blister paving
Controlled crossing facility	Red	Varies (see below)	
1. On footways at either side of road		L shape	Stem 1200mm wide kerbside 800mm/ 1200mm at inset[a] or 1200mm at in-line[b]
2. On central islands (refuges)		Kerbside	800mm wide at each side if greater than 2m wide or full width if less than 2m wide
Uncontrolled crossing point	Grey or Buff	Varies (see below)	
3. On footways at either side of road		Kerbside	800mm wide at inset[a] crossing point 1200mm wide at in-line[b] crossing point
4. On central islands (refuges)		Kerbside	800mm wide at each side if greater than 2m wide or full width if less than 2m wide

[a] Inset crossing is away from a junction

[b] In-line crossing is at junctions in line with direct pedestrian movement

13.6 References

1. TRL Project Report 82 – Accidents involving visually impaired people using public transport or walking, TRL – UK. Available from the Transport Research Laboratory, Crowthorne, Berkshire RG11 6AU, Tel +44 1344 770783/84

2. Guidance on the use of tactile paving surfaces – DETR (UK), Available from The Stationery Office, PO Box 276, London SW8 5DT. Tel +44 870 600 5522

3. Reducing Mobility Handicaps, Towards a Barrier-Free Environment – Institution of Highways and Transportation (UK). Available from IHT, 3 Lygon Place, Ebury Street, London SW1W 0JS

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Diagram 13.8 Dimensions required by pushchairs and wheelchairs