

**US Access Board
United Kingdom Intersection and Pedestrian Crossing Design
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Introduction

This paper sets out a range of issues, which are taken into account when determining the design of interchanges and pedestrian crossings in the UK.

Some background information on the needs of visually impaired people is set out briefly followed by examples drawn from the appropriate Guidance and actual installations.

Disabled Persons Transport Advisory Committee

DPTAC was set up in 1986 as statutory advisors to the Secretary of State for transport, on matters to do with disabled people and public transport. The street environment was included within that brief.

In the year 2000, the remit was extended to cover the built environment.

The Client Group

The total UK population is around 60 million people. The most recent census has shown that 1.97 million people have a serious sight problem. This means that they could not, even with the aid of glasses, recognise a friend on the other side of the street, or read newsprint.

Approximately 1 million are registrable as blind or partially sighted.

There is a strong correlation between age and sight loss, and therefore it can be anticipated that the number of sight impaired people will significantly increase over the next 30 years, due to the demographic change that is taking place in the population.

Many visually impaired people will have additional impairments, such as hearing loss, loss of sensitivity, particularly in feet and hands, and arthritis.

Mobility

An able-bodied person walking through the environment is in constant receipt of information. It is estimated that 70-75% of that information comes through eyesight, 10-15% through hearing, and the balance through the senses of touch, smell and taste.

It follows, that even a mild degree of sight loss will reduce the information received, and for a person who is totally blind and profoundly deaf, the loss of information might be as much as 90%.

This "information deficit" has a serious impact on a person's ability to move around safely, independently and with confidence.

Sight loss may well be accompanied by a deterioration of other senses, but in practical terms, a visually impaired person may well pay more attention to what they are able to hear and to what they are able to feel through their feet in contact with the ground, and their hands in contact with street furniture.

In particularly noisy situations, caused perhaps by high density traffic, proximity to a construction site, or just general street activity, a visually impaired person may become very confused and disorientated.

The mobility problem can be eased by the provision of a guide dog, about 5000 owner/guide dog partnerships exist in the UK. Approximately 50,000 people have received long cane training. However, the remainder may use a guide cane, symbol cane, or just get around as best they can.

Design Criteria

The designer should be aware of user needs and take these fully into account in designing the street environment.

The standard 4 or 5 inch kerb is a clear indication to a visually impaired pedestrian that they have found the interface of the footway and the carriageway. A long cane user may well use the kerb to find their way along a street and around the radius of an intersection. An individual not using a mobility aid should certainly realise just through the difference in level, that they are stepping off one surface on to another.

However, the kerb creates an obstruction for a wheelchair user, and therefore a kerb cut or dropped kerb should be installed at appropriate locations. Where this is done, tactile paving should be laid to act as a warning that the kerb has been levelled.

The street should be clear of unnecessary street furniture and clutter. However, some street furniture can provide useful landmarks or wayfinding aids.

If the various potential obstructions and aids in the environment are arranged in a regular and logical pattern, they will be easier to identify, remember on a familiar route, or predict on an unfamiliar route.

The techniques available to the designer are very simple. Colour and luminance contrast should be used to highlight important features of the street scene, such as signal control boxes at pedestrian crossings.

There should be a good level of lighting, evenly distributed.

Tactile ground surface indicators should be used strictly in accordance with guidelines.

Features such as signal control boxes should be easy to operate.

Examples of Intersections and Crossings

The following is a series of examples of different types of intersection and crossings.

Side Road Entry

This is where a relatively minor side road joins a more significant main road.

An uncontrolled crossing, that is a dropped kerb with tactile paving, might be positioned in the line of travel of the footway running along the main road.

Alternatively, the crossing might be indented a few metres.

In either case, the pedestrian may well rely on their hearing to tell them whether it is safe to cross. In this situation, traffic speed is important. The shorter the radius of the corner of the intersection, the slower will be the speed of traffic turning into the side road.

Conversely, a long radius will encourage traffic to swing into the side road without a significant reduction in speed, thus increasing the risk to a visually impaired pedestrian.

Traffic Calming

In order to reduce traffic speed, the road surface is sometimes raised to the same level as the footway, or with, at most, a 25mm difference in level.

Wherever the surfaces are the same level, the interface must be marked by guardrails, planters, or some other positive barrier. Any crossing places must be indicated by the appropriate use of tactile paving.

This traffic calming situation might be used at a side road entry, a T-junction, or a full crossroad intersection. The raised road surface might extend the entire length of a high street. In all these circumstances, it is considered important that a short curve radius is used to keep traffic speed down to a minimum.

Controlled Crossings

These are crossings where the pedestrian has clear priority.

Zebra Crossing

In this situation, the road surface is marked with alternate panels of black and white, parallel to the direction of travel. At either side, there will be a dropped kerb and tactile paving. There is no control signal for pedestrians or vehicles.

A no parking/stopping zone is made each side of the crossing.

A pedestrian wishing to cross should find that traffic will stop and give them priority. Of course, this is quite difficult sometimes in a real world situation. Visually impaired people using zebra crossings are usually in a somewhat stressed condition, as they know that they are relying on the good will and good driving skill of the motorist.

The TGSi should be configured with a strip along the kerb for the **full width of the kerb cut, and with a strip of TGSi extending from the crossing to the buildingline. This acts as a marker to a pedestrian walking along the footway, and lets them know that if they turn towards the road they will find a controlled crossing.** The colour of the TGSi is normally red, to indicate that it is a controlled crossing, and to contrast with surrounding footway surfacing.

A zebra crossing may have a traffic island or traffic separator in the middle of the road. This is not a pedestrian refuge area.

Pelican Crossing

A pelican crossing differs from the above in that there is a pedestrian operated, or time operated, traffic control signal. When the signal shows red, i.e. stop, to traffic, a green man, i.e. safe to cross signal, is displayed on the opposite side of the road. This signal is often accompanied by a bleeper, i.e. audible signal, and/or a rotating conical knob or tactile indicator.

The control box is normally fitted on the right hand side of the crossing, note the traffic is normally coming right to left on the near side. The post supporting the control box is positioned at the edge of the area of TGSi. The control box has a bright yellow housing, and the face of the box, which contains the push button, is orientated to face where a pedestrian would be standing waiting to cross. The

audible signal emanates from the near side and the far side, and the volume can be adjusted to meet local requirements. The time allowed to cross is also variable and is usually matched to carriageway width.

The TGSi is laid along the kerb with a strip extending across the footway to the buildingline. There would also be a kerb cut.

Visually impaired people prefer this type of crossing signal to be equipped with the green man, the audible bleeper and the tactile cone.

This system is sometimes used at a full traffic light controlled intersection. There may be an all round crossing phase, i.e. the traffic stops simultaneously on all four arms of the crossroads. If the crossing phase is not all round, the bleeper or audible signal is not used, as it could be confused with one on an adjacent crossing. In this situation, the green man and rotating cone will be the only signals. In many cases, particularly at older traffic light controlled junctions, there is no pedestrian phase or if there is, it is indicated only by a green man on the far side of the road and a "wait" signal on the near side control box.

Adjacent Crossings

In some cases, perhaps on a dual carriageway, with central pedestrian reservation, there would be two crossings close together.

In order to provide an audible safe to cross signal, a very directional sound has been developed. This is termed "bleep and sweep".

The sound will be heard by a pedestrian waiting to cross, but not by a pedestrian waiting at the nearby or adjacent crossing.

Pufin Crossing

PUFIN stands for "pedestrian user friendly intelligent". In simple terms, the time allowed to cross is varied according to the walking speed of a pedestrian. This avoids the often unnecessary waiting

time for traffic when a pedestrian has walked quickly over a crossing, but allows more time if a pedestrian is moving slowly. Over a period of time, the pedestrian crossing time and traffic flow time will average out to whatever is thought necessary for the prevailing traffic conditions.

The pufin crossing has other refinements such as position the green man on the near side.

Because the driver can no longer see the green man, it prevents him or her anticipating the change and creeping forward or revving up the engine, either of which can cause stress to a pedestrian.

Tucan Crossing

This stands for "Two Can cross", i.e. pedestrians and cyclists. This type of crossing may be favoured by cyclists who do not have to dismount and may be able to continue their journey on a cycle track on one side of the road, traverse the tucan crossing and continue their journey on the cycle track on the other side of the road without having to stop or dismount. Conversely, most visually impaired pedestrians do not like tucan crossings, as they feel vulnerable to collision with cyclists.

The tucan crossing is much wider than a pelican and puffin, and has a control box at both left and right sides on each side of the road.

Areas of Concern for Visually Impaired Pedestrians

Our evaluation of different types of crossing, indicate that visually impaired pedestrians prefer pelican or puffin crossings with the full specification of green man, audible signal and rotating cone.

Zebra crossings give rise to stress, as the pedestrian has less confidence that the traffic will stop. Similarly, visually impaired pedestrians do not like tucan crossings, as they feel vulnerable to collision with cyclists.

Pelican and pufin crossings without an audible signal have two disadvantages. The first is that when seeking to find a crossing,

there will be no audible indicator of where the crossing is, as would be the case if someone else was using the crossing. Secondly, a bleeper or audible signal on the far side of the road acts as a beacon to aim for and assist those who may find it difficult to maintain a correct line when crossing the road.

Traffic calming systems, which are usually raised road surfaces, are becoming fashionable. It must be said that they are also successful in reducing traffic speed and vehicle to pedestrian accidents. However, unless the visually impaired pedestrian is given a clear indication of where the footway ends and the carriageway begins, they are put at risk. Even if the risk is small, a visually impaired person moving around in that environment will be in a constant state of stress.

Crossing Priority

In the normal course of events intersections and pedestrian crossings are designed from the stand point of the motorist rather than the pedestrian.

Careful consideration must be given to whether in some circumstances the needs of the pedestrian should be paramount.