

# Signals & Traffic Control Team



## History of traffic signals:

- The first known device for controlling traffic was installed in Westminster, London in 1868. It had arms to tell you when to stop or go and was lit by gas light.
- Then in 1923 an African American inventor names Garrett Morgan patented the three colour light system.
- The first three colour automated lights installed in Britain were in Wolverhampton in 1926. One to remember for a pub quiz!
- These early examples did not work when there were different amounts of traffic on each side so controllers (like early computers) were introduced to alter the green time for each side of the road at different times of the day.
- The next step was to make controllers react to the vehicles approaching and change the green time to reflect this. They did this by installing rubber tubes in the road. When a vehicles drove over the tube a shot of air went into a sealed box and forced electrical contacts, which sent a signal to the controller that a vehicle was approaching.
- Signal controlled pedestrian crossings soon followed (which is our focus today), but were not used until the 1950s
- Technology has moved on a lot since then and current traffic signals have complex controllers on the side of the road which have microchips in them and are programmed like computers. Magnetic loops in the road are used to detect and count the traffic, and the controllers decide what timings to give dependant on the amount of traffic. Each set of signals you see nowadays has a different individual programme running it.
- There are also additional software programmes and equipment that you can add to a set of traffic lights to make them link together, which is often used in city centres and controlled from a control centre. This is known in the industry as UTC (urban traffic control), and runs software programmes such as SCOOT (thus providing co-ordinated real time adaptive traffic control).

# Signal controlled pedestrian crossings

The focus of this presentation is on signal controlled pedestrian crossings. There are three main types of pedestrian crossings:

- Pelican crossings
- Puffin crossings
- Toucan crossings



# Pelican crossings



Pelican stands for Pedestrian Light Controlled crossing and is historically the most widely used type of crossing in Britain. It is a stand-alone crossing with farside Red and Green men on the opposite side of the road from where the pedestrians stand.

Pedestrians call the green man by pressing the push button. When the green man illuminates it is an INVITATION to cross the road only. The green man will extinguish after a fixed amount of time (dependant on the road width), followed by a flashing green man and flashing amber to traffic period. This is a clearance period to enable pedestrians to cross safely to the other side of the road, while motorists give priority to pedestrians.

A Pelican crossing has Zig-Zag road markings to keep the crossing visible. In order for the police to enforce Zig-Zags, a Statutory Notice (like a TRO) is needed, which must be publicly advertised prior to installation.

The main disadvantage of the Pelican crossing is that during the flashing Green man and flashing amber period drivers can occasionally intimidate pedestrians by revving their engines, or even worse, starting to roll forward.



# Puffin crossings

Puffin stands for Pedestrian User-Friendly INtelligent crossing. It is a stand-alone crossing with nearside Red and Green men on the pole above the push button, on the same side of the road as the pedestrian.

Pedestrians call the green man by pressing the push button. The Puffin also has a kerb side detector to detect a pedestrian waiting to cross. If a pedestrian changes their mind, or crosses in a gap in the traffic, the demand for the green man is removed. This prevents unnecessary delay to vehicles.

As with Pelican crossings, the green man is an INVITATION to cross the road only. And it is timed to get pedestrians established on the crossing, not all the way across the road. Once a pedestrian steps off the footway they no longer have a signal, and should not feel rushed when the Red man comes on because they shouldn't be able to see the near-sided display. There is no flashing green man and amber to traffic period, instead the pedestrian clearance time is extended by on crossing detectors; so any uncertainty, as experienced with the Pelican is removed. A Puffin crossing has Zig-Zag road markings. A Puffin crossing has Zig-Zag road markings so also requires a Statutory Notice and advertising.

This type of crossing is now the Department for Transport's standard form of pedestrian crossing in the UK, and the timings on our crossings in Bristol are set by national standards and design guidance.



# Toucan crossings & Parallel crossings

The Toucan crossing is for Pedestrians and cyclists (two can cross).

It is a stand-alone crossing (see first photo) which provides an un-segregated crossing for pedestrians and cyclists with Red and Green men and a Green cycle symbol. These can be either on the same pole as the push button or on the other side of the road.

Pedestrians / cyclists call the green man by pressing the push button (as with a Pelican or Puffin crossing). A toucan normally has an on crossing detection similar to the Puffin, as it also has no flashing green man and amber to traffic period. If there are no pedestrian detectors then a fixed clearance time is provided, depending on the width of the road. The pedestrian clearance period (whether fixed or extendable) is displayed as a Red man as there is no flashing green man.

The photo to the right is an example of a Parallel crossing (on Lamb Street, Old Market), which operates like a Toucan, but also provides segregation for cyclists and pedestrians.

For any stand-alone crossing (Pelican, Puffin or Toucan) the length of time a pedestrian has to wait for the Green man at these type of crossings will depend upon whether the crossing is on UTC, vehicle actuated or PTM control. The average pedestrian waiting time in Bristol is 20 seconds, but with no traffic it can be as low as 3 secs.



# Facilities for visually impaired pedestrians



At most modern signal controlled pedestrian crossings, various facilities are provided to assist blind and visually impaired people.

Red tactile paving in an L shape is provided to denote that the crossing is controlled, and to lead a visually impaired person to the push button, which is usually located on the right hand side (but can be on the left at existing older sites that have push buttons on the left).

Where possible when the Green man is lit, an audible signal is emitted. There are instances where this would be unsafe, for example where crossings are close together, or within a junction where the green man appears at different times on different approaches.

Where this occurs, tactile, rotating cones are installed beneath the push button unit. These are knurled cones that rotate for the duration of the green man, indicating when it is safe for a pedestrian to cross.



# PTM and other technical notes



Traffic Signs Manual – Chapter 6: Traffic Control

## 11.6 Pedestrian crossing sequences and timings

11.6.1. The pedestrian crossing sequence at a signal junction is shown in Table 11-1 and consists of two parts. The first is known as the “invitation to cross”, and is the period in which the green pedestrian symbol shows. This is followed by the clearance period, which should be long enough to cross the carriageway for someone stepping off the kerb at the end of the invitation to cross. The clearance period is configured differently depending on whether far-side or nearside signalling is used. At far-side signals a black-out is shown, and neither the red nor the green pedestrian symbol is illuminated. This is followed by an all-red period. At nearside pedestrian facilities, the invitation to cross is followed by an all-red period.

## 11.7 Design walking speed

11.7.1. A walking speed of 1.2 m/s is conventionally used to calculate timings for crossings. This results in timings that are suitable for the majority of crossings. The clearance period is key, as this is what allows people to clear the crossing if they step off the kerb as the green symbol goes out. If this is properly calculated, it will ensure there is sufficient crossing time.

11.7.2. A lower design speed of 1.0 m/s may be used, either on a site-by-site basis or as an area-wide policy. Where there is a large number of slower pedestrians, this may be beneficial. The use of on-crossing detection may also help, by automatically extending crossing times where needed.

11.7.3. The duration of the invitation to cross period will depend on how many people are waiting, time of day, and distance to cross. Generally, it should be long enough to allow people to clear the footway, establish themselves on the crossing and avoid turning back when the all-red or blackout period begins.

**Table 11-1** Sequences and timings for farside pedestrian facilities at signal-controlled junctions

Period P	Farside pedestrian signal	Vehicle signal	period duration (seconds)
1	Red	Green	Dependent upon cycle time.
2	Red	Amber	3
3	Red	Red	Minimum to clear traffic in the junction.
4	Green (invitation to cross)	Red	6-12, depending upon carriageway width and pedestrian density.
5	Black-out (clearance)	Red	3-15, may be extendable where on-crossing detection is used Where pedestrian countdown is used, this period is fixed and cannot be extended.
6	Red	Red	1-3
7	Red	Red + Amber	2

**The ‘Pre-Timed Max’ (PTM) facility makes pedestrian crossings instantaneous for pedestrians, i.e. a pedestrian pushes the button and the signals instantly go to leaving amber and red for the traffic and then green for the pedestrians. Once it goes back to the traffic green it then runs a pre-timed maximum of 20-30 seconds before it becomes instantly responsive again.**



Items not covered in this PowerPoint presentation:

**Countdown crossings**

**Pegasus crossings**

**Pedestrian Operated Traffic Signals (POTS):**

For information Pegasus crossings are crossings with special consideration for horse riders. Pedestrian operated traffic signals are not stand-alone crossings, but actually form part of, and are controlled by, an adjacent traffic signal junction controller.

They are usually some distance from the junction signals so they look like a normal pedestrian crossing with Red and Green men on the other side of the road from where the pedestrian is standing.

The length of time a pedestrian has to wait for the green man tends to be longer than at stand-alone pedestrian crossing. This is due to satisfying the other demands at the junction. There is no standard figure but pedestrian delay is kept to a minimum in line with Bristol City Council policy.

**Any questions?**

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