

## Traffic Advisory Leaflet 2/11

April 2011



# Portable Traffic Signals for the Control of Vehicular Traffic

## Introduction

This leaflet provides advice on the use of portable traffic signals at road and street works. Detailed advice is already given on the design and use of these, primarily in:

- An Introduction to the Use of Portable Vehicular Signals ('the Pink Book')<sup>1</sup>
- Safety at Street Works and Road Works – A Code of Practice ('the Red Book')<sup>2</sup>
- Traffic Signs Manual Chapter 8 ('Chapter 8')<sup>3</sup>

This leaflet is designed to complement these documents by providing a summary of the main requirements. It does not cover portable signal-controlled pedestrian facilities. For advice on these, please see Traffic Advisory Leaflet 3/11: Signal-controlled pedestrian facilities at portable traffic signals<sup>4</sup>.

Portable traffic signals might be required as a consequence of road works, or street works. They should not be confused with temporary traffic light signals, which are permanent signals mounted in a temporary fashion.

## Road works and street works

For the purposes of this leaflet, road works are any works carried out primarily to improve or

maintain the highway, such as resurfacing of the road. Street works are any works carried out by statutory undertakers to place or maintain apparatus such as water mains or electricity cables ('undertaker' is defined in the New Roads and Street Works Act 1991<sup>5</sup>). To simplify this leaflet both road works and street works will be referred to from this point as road works. This leaflet only considers circumstances in which works are carried out by statutory undertakers or permitted by the traffic authority.

Portable traffic signals are most often used at shuttle working sites, i.e. sites where the width of the road is restricted so that traffic can only pass in one direction at a time.

## Legal Considerations

### Powers to place portable traffic signals

Statutory undertakers using portable traffic signals for shuttle working do not need the traffic authority's permission to use them<sup>6</sup> but should notify the traffic authority. For other types of sites, such as those where a junction is included in the working length, the traffic authority should, in addition, be consulted when planning the works.

How this is done will depend on the nature of the works and the systems used by the traffic authority. Whatever system is in place, early engagement with the traffic authority can help resolve potential problems before they arise. Portable traffic signals can have a significant impact on traffic flows which can raise network management issues for traffic authorities. If portable signals are needed to help manage an emergency situation, for example a burst water main or other urgent repairs, a statutory undertaker can place them before notifying the traffic authority. However, they should notify the authority as soon as it is practicable to do so<sup>6</sup>.

Anyone other than statutory undertakers must obtain permission from the traffic authority before placing portable traffic signals<sup>7,8</sup>.

Portable signals must comply with the relevant legislation<sup>8</sup> and various components used in connection with them must be type-approved.

**Local highway and traffic authorities are responsible for ensuring that any equipment placed on their road networks is safe and complies with relevant legislation.**

## Type Approval

Direction 56 of TSRGD<sup>8</sup> requires control equipment to be of a type approved in writing by the Secretary of State. Type approval is carried out to the relevant specification; the process is administered by the Highways Agency. Performance specifications are available from the Highways Agency site [www.tssplansregistry.org](http://www.tssplansregistry.org).

**It is for the traffic authority to ensure that any equipment placed on their network has been type approved in accordance with TSRGD direction 56<sup>8</sup>.**

## Layout Considerations

Generally, on single carriageway roads, if the width of the road works still allows 6.75m of

carriageway, two-way traffic can operate satisfactorily. Chapter 8<sup>3</sup> has details relating to bus routes and considerations for cyclists. Widths of 5m can be used on two-way roads for short duration works if heavy or wide vehicles do not normally use the road. Specific information on carriageway widths for cyclists at road works can be found in Traffic Advisory Leaflet 17/99: Cyclists at Road Works<sup>9</sup>.

Portable vehicle signals can be mounted at lower heights than permanent ones. This can make them less visible, and prone to being obscured by vehicles. Queues, high sided vehicles (especially buses) and the geometry of the approach must be taken into account when considering the placing and mounting height of the signal heads. TD 50/04: The Geometric Layout of Signal-controlled Junctions and Signalised Roundabouts<sup>10</sup> contains advice on visibility and stopping sight distances.

See the Pink Book<sup>1</sup> and Chapter 8<sup>3</sup> for detailed advice on site layouts.

## Length of controlled area

In general, a long working area (working length) will result in long all-red settings and consequently longer queues. It is recommended that the minimum length necessary is used, with a maximum of 300m. Some traffic authorities have a lower maximum and the working length should be discussed at an early stage.

## Level crossings and other barrier-controlled sites

If the planned works are on an approach to a level crossing, or any installation controlled by barriers, such as a moveable bridge, the authority responsible for that site must be informed of the works<sup>11</sup>. See Traffic Advisory Leaflet 1/08: Wig-wag Signals<sup>12</sup> for contact details.

Under no circumstances should portable traffic signals be used where queuing vehicles may block back across a level crossing, either preventing a barrier being used, or preventing drivers being able to exit the section between stop lines/ give way markings.

## Existing signal-controlled junctions & pedestrian crossings

If an existing permanent signal installation is to be taken out of service, arrangements should be made to switch off the equipment, erect suitable signs, such as TSRGD diagram no. 7019<sup>8</sup>, and cover any signal heads/ beacons to prevent misinterpretation. The traffic authority's permission must be sought to switch off permanent traffic signals.



Diagram 7019

Pedestrian facilities that are taken out of service are a particular problem. The nature of the works might mean that pedestrians will have to use a different route, which will need signing. Consideration should be given to providing an alternative facility on the new desire line.

## Uncontrolled facilities for pedestrians

If pedestrians have to cross the length of road being worked on, the road works will normally mean that the volume and speed of vehicles through the working area will be reduced and uni-directional at any one time. One option is to extend the distance between the end of works and the WAIT HERE sign to TSRGD diagram no. 7011<sup>8</sup>. Pedestrians can then cross within the controlled section. If this

method is used, the all-red would be adjusted to the setting in the Pink Book, based on the distance between WAIT HERE signs but can be set marginally higher by, say, one incremental setting. However, if the setting is too high, unnecessarily increasing delays, it could bring the signals into disrepute. If there is a particular peak of pedestrian activity, for example at school times, manual control could be used to allow the all-red setting to be held during periods of high pedestrian use. In these circumstances, the crossing point should be visible to the operator at all times.

If this form of pedestrian crossing provision is being used, it is essential that there is good intervisibility between vehicle drivers and pedestrians. If site conditions permit, the footway should be ramped down to the carriageway - see the Red Book<sup>2</sup> for details.

## Side roads within a working length controlled by portable traffic signals

The decision to control any side roads with signals will depend mainly on the visibility from the side road to the main road signal approaches. If this is poor then signal control is likely to be needed. The nature of the side road will also be a factor but even drivers exiting a minor cul-de-sac will have difficulties if they cannot see vehicles entering the working length.

Drivers entering the works from an unsignalled side road or access need to be made aware that the main road is under signal control.

## Equipment

The decision on what type of equipment to use will depend on many factors, including method of setting up, choice of power supply, method of communication between controller and signal head, and cost.

## Vehicle Actuation (VA)

All equipment used on public roads must be capable of working in Vehicle Actuated (VA) mode<sup>13</sup>. These signals use detectors to monitor traffic flows and use this information to adjust the length of the signal green time to reduce delays.

VA mode should always be used unless there is a specific reason, such as using the manual mode on a short-term basis to move plant into, or out of, the controlled area. Use of VA will help to reduce unnecessary delays.

If the signals are to be operated under manual control at any time, both ends of the working area should be clearly visible to the operator at all times.

Vehicle detectors (Microwave Vehicle Detectors, or MVDs) used at portable traffic signals must have received type approval from the Highways Agency. To be able to work in the VA mode it is essential that the MVDs are set up as detailed in the Pink Book<sup>1</sup>.

## Method of setting up

The method used will depend on what type of equipment is chosen - more information is given in the Pink Book<sup>1</sup>. The manufacturer's instructions should also be referred to. On some installations the choice can make a difference to the efficiency of operation, especially during off-peak periods.

## Power supply

Power supply types include: diesel or Liquefied Petroleum Gas (LPG) generator, battery or mains electrical supply through a suitable transformer.

Clearly some will be noisier than others and some will have a greater carbon footprint than others. If it is decided to connect to a mains supply, arrangements will need to be made in advance. All temporary electrical works must comply with BS7671<sup>14</sup>.

## Method of communication

There are two basic types available: cable- and radio-linked.

In a cable-linked system, the cables will normally be required to cross the carriageway at some point. If so, cable crossing protectors should be used to protect them from physical damage and to reduce trip hazards. Cables are particularly vulnerable at a vertical change of direction, such as a kerb face. Cable crossing points should avoid areas where vehicles are likely to be turning, braking or accelerating.



Diagram 7013

Cable routes should avoid areas where there is pedestrian traffic. If this is unavoidable the cable route, as a minimum, should be covered with a ramp suitable for wheelchair use. See the Red Book<sup>2</sup> for details.

If cables cross a carriageway, signs to TSRGD diagrams 7013 and 7010.1<sup>8</sup> (varied to "RAMP AHEAD") should be used.



Diagram 7010.1

For longer term installations it might be appropriate to cut slots in the road surface so that the cables can be buried temporarily.

Radio-linked systems avoid the use of cables, but care needs to be taken to ensure that other sources of radio transmission and obstructions do not interfere with the radio link.

## Signal heads

The minimum requirement<sup>8</sup> is for one signal head on each approach.

For safe operation drivers must be able to see at least one signal on approach, and one while waiting at the 'WAIT HERE' sign.

## Settings

Initial timings should be optimised according to the advice given in the Pink Book or the manufacturer's instructions. Optimising the timings can be time-consuming, but is important as incorrect timings can lead to delays, frustration and even accidents.

The equipment may have a selector for VA, Fixed Time (FT) or Manual. Some controllers only have a selector for VA or Manual. The equipment should normally be operated in the VA mode unless there is a very good reason to select FT or Manual. If the traffic authority agrees that FT or Manual operation is essential, a record of the decision should be kept.

The operation of the controller should be checked regularly, at least daily. If portable traffic signals are on site but not in use, the signal heads and associated signs should be turned away from oncoming vehicles, or covered. A sign warning of portable traffic signals when none exist is frustrating for drivers and brings road works signs/ signals into disrepute.

All signs and signals should be removed as soon as the works are complete.

## Traffic Signs

For advice on signing at road works sites see Chapter 8<sup>3</sup>. Stability of sign frames and signal equipment should be ensured by the use of suitable ballast - details can be found in Chapter 8<sup>3</sup>.

Diversion routes and/or informatory signing involving either changes to existing signs or the provision of dedicated signs, can be very effective in reducing through traffic and minimising delays. The police and relevant traffic authority, including those responsible in any adjacent authorities if the works are near a boundary, should be consulted.

## Bus Stops

If there are bus stops on the approaches to, or in, the working length they will generally need to be moved to a temporary position. The traffic authority and bus operators should be consulted.

## Training

Portable traffic signals that have been poorly set up can lead to frustration, a greater risk of accidents, additional costs in fuel and time and increased pollution. It is essential that those responsible on site have had the necessary training. Many authorities require National Highways Sector Scheme (NHSS)<sup>15</sup> training for their contractor's staff. There are a number of organisations that have training programmes leading to the appropriate Sector 12 certification - more information is available from the United Kingdom Accreditation Service (UKAS).

## Maintenance

Access to the signal control panel must be limited<sup>13</sup> to prevent unauthorised changes to timings. Information on maintenance arrangements and contact telephone numbers for the contractor or the signal hire company should be available at all times. It may be helpful to print fault reporting information on the signal equipment, to enable fault reporting by the general public.

Switching signals to Fixed Time (FT) is a temporary expedient and not a solution for faulty VA. If equipment cannot be repaired, a

replacement should be provided. Permanent use of FT is not acceptable.

On site, the following should be checked at least daily:

- safety/stability of signals and lamp integrity;
- cables, for security and damage;
- signal heads and detectors for correct alignment;
- timings, to ensure correct VA operation; and
- power supply, to ensure continuous operation until at least the next maintenance inspection visit.

Signal head lenses should be cleaned regularly. The interval will depend on the site condition but should be not less than once per week.

Where signal dimming facilities are provided, the light sensor should be cleaned regularly. A build up of dust and dirt will affect its operation, possibly causing the signals to dim during daylight and become less visible to drivers.

## Temporary Traffic Signals

In some circumstances, a temporary facility may be more suitable than a portable one. Temporary facilities use permanent equipment mounted in a temporary fashion, most commonly using standard poles in concrete filled barrels, although specially designed temporary equipment and mounting systems are available.

The decision on what type of facility to provide is for the traffic authority. Many temporary installations will need careful design and the traffic authority signal control designers should be consulted at an early stage.

## References

1. An Introduction to the Use of Portable Vehicular Signals, DfT, [www.dft.gov.uk/pgr/roads/tpm/](http://www.dft.gov.uk/pgr/roads/tpm/)
2. Safety at Street Works and Road Works - A Code of Practice, DfT, [www.dft.gov.uk/pgr/roads/tpm/](http://www.dft.gov.uk/pgr/roads/tpm/)
3. Chapter 8 of the Traffic Signs Manual, TSO, [www.dft.gov.uk/pgr/roads/tpm/](http://www.dft.gov.uk/pgr/roads/tpm/)
4. Traffic Advisory Leaflet 3/11, Signal-controlled pedestrian facilities at portable traffic signals, DfT, [www.dft.gov.uk/pgr/roads/tpm/](http://www.dft.gov.uk/pgr/roads/tpm/)
5. New Roads and Street Works Act 1991 Sections 48 and 89 (107 and 148 in Scotland), TSO, [www.legislation.gov.uk](http://www.legislation.gov.uk)
6. New Roads and Street Works Act 1991 Section 65, TSO, [www.legislation.gov.uk](http://www.legislation.gov.uk)
7. Road Traffic Regulation Act 1984, Section 65, TSO, [www.legislation.gov.uk](http://www.legislation.gov.uk)
8. Statutory instrument no. 2002/3113, the Traffic Signs Regulations and General Directions 2002, as amended, TSO, [www.legislation.gov.uk](http://www.legislation.gov.uk)
9. Traffic Advisory Leaflet 17/99: Cyclists at Road Works, DETR, [www.dft.gov.uk/pgr/roads/tpm/](http://www.dft.gov.uk/pgr/roads/tpm/)
10. TD50/04: The Geometric Layout of Signal-controlled Junctions and Signalised Roundabouts, Highways Agency, [www.dft.gov.uk/ha/standards/dmrb/index.htm](http://www.dft.gov.uk/ha/standards/dmrb/index.htm)
11. New Roads and Street Works Act 1991 Section 93, TSO, [www.legislation.gov.uk](http://www.legislation.gov.uk)
12. Traffic Advisory Leaflet 01/08: Wig-wag Signals, DfT, [www.dft.gov.uk/pgr/roads/tpm/](http://www.dft.gov.uk/pgr/roads/tpm/)

13. TR2502B: Performance Specification for portable traffic signal control equipment for use at road works, Highways Agency, [www.tssplansregistry.org](http://www.tssplansregistry.org)
14. BS 7671: Requirements for Electrical Installations, BSi, [www.bsigroup.com](http://www.bsigroup.com)
15. National Highways Sector Schemes (NHSS) for Quality Management in Highway Works, UKAS, [www.ukas.com](http://www.ukas.com)

NOTE: If referring to these documents it is important to check that they have not been superseded.

## Contact Details

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