USE OF TECHNOLOGY FOR TRAFFIC ENFORCEMENT: GUIDANCE ON DEPLOYMENT

1. The purpose of this circular is to provide guidelines for local highway authorities on the deployment of automatic devices for the detection of speeding and traffic light offences. The Road Traffic Act 1991 makes various provisions relating to the use of such devices, including a power for highway authorities to install and maintain the equipment. This guidance is intended to assist authorities who are considering the use of such devices. It explains the road safety objectives which the devices are designed to attain and draws attention to important considerations which should be taken into account in their deployment. The relevant legislative provisions on the use of technology for enforcement are expected to come into force on 1 July 1992.

2. It is recognised that there is a need for national guidance to all agencies involved in the use of the new enforcement technology. In addition to this circular, guidance on other aspects of implementation has been drawn up by the Home Office in consultation with the police and the courts and will shortly be issued to them. It will address the operational and procedural matters related to the detection and prosecution of offenders using this technology. Where appropriate, the guidance will contain elements from this circular, for example on the road safety objectives and the need for co-ordination between the different agencies involved.

3. Up to now there has been limited experience in this country of the use of traffic light cameras and no "live" use of cameras for enforcing speed limits. Hence the guidance in this circular is necessarily provisional. It should be possible to give more definitive guidance at a later date in the light of experience in a variety of traffic situations, and analysis of the effect of camera enforcement on driver behaviour.

4. This circular is aimed at the use of devices at fixed sites on or adjacent to the highway. It does not cover the deployment of portable devices by the police. That will be covered as part of the separate guidance issued to Chief Officers of Police by the Home Office.
Road Safety Objectives

5. The main aim of road traffic law enforcement is to reduce road casualties by improving compliance with the law. Excessive speed increases both the risk of an accident occurring and the seriousness of damage and injury arising from the accident. Recent research suggests that each 1 kph reduction in average speed can produce a 5% reduction in injury accidents\(^1\). Non-compliance with traffic light signals also increases the risk of an accident occurring. In urban areas, around 13% of injury accidents at traffic lights are right-angle collisions which are associated with red light running\(^2\). Increasing compliance with speed limits and traffic light signals should therefore bring about significant reductions in accidents, thereby contributing to the overall target for casualty reduction.

6. The use of camera technology can aid enforcement in two ways: it can provide the police with an important aid in the detection and prosecution of offenders and at the same time it can act as a significant deterrent. In developing strategies for deployment and in identifying individual sites, authorities will need to bear in mind that the ultimate objective is to maximise the road safety benefits which can be achieved in any given area.

Consultation and Liaison with Police, Courts and Crown Prosecution Service

7. A number of traffic light cameras are already in use in different parts of the country. Early experience has shown that they have the capacity to detect a substantial volume of offences, much greater than is possible using conventional methods of enforcement. A similar result can be expected from speed detection cameras. The use of such technology therefore has significant resource implications for all the agencies involved: the police, the courts, the Crown Prosecution Service, and highway authorities themselves. There is a danger that the new technology will not have the desired deterrent effect unless efficient follow up procedures are in place to deal with the processing of offences.

8. For those reasons it is essential that from the earliest stages when the use of technology is being considered, discussions take place with all these agencies at a local level, and that agreement is reached on detailed plans for implementation. Co-ordination between the different agencies at a local level and on a regular basis is essential if the maximum benefit is to be gained. The need for early consultation is being similarly emphasised in guidance issued to the police, the Crown Prosecution Service and the courts.

9. The police will be responsible for operating and maintaining the cameras and for initiating the follow-up procedures to deal with the offences detected. Their full co-operation and agreement in the use of technology is, therefore, essential and should be secured at an early stage.

10. Consultation should also be carried out locally with the courts, the Fixed Penalty Ticket Offices and the Crown Prosecution Service. This should ensure that the necessary follow up processes are in place, that an estimate of the volume of offences to be dealt with is agreed and that sufficient resources are available in all agencies to deal with that workload.

Siting of Devices: Accident Analysis

11. Highway authorities will need to adopt a systematic approach to the selection of suitable sites for the use of cameras. This should be based on the use of local authority accident statistics for the area, supplemented with any additional information and advice which the police are able to provide. In the case of traffic light cameras, accident analysis should involve a search of accidents where non-compliance with a traffic light control is indicated. A similar search can be made for accidents where excessive speed is indicated as a major contributory factor.

12. The accident records for a particular site should be examined more closely to identify the worst approach road, where a junction is involved, or the worst direction or lane for speed-related accidents. Liaison with the police is important as they may well be able to provide additional information from their own records, or on the basis of local experience to supplement highway authorities' records. All this information, including factors which cannot be tackled by the use of camera technology, should be considered in assessing the suitability of particular sites. Methods similar to those used to identify sites for local safety schemes are appropriate, but it is essential that the accident record should be significantly related to speeding or failure to comply with a traffic light signal.
13. A site should be selected only if the police have indicated that they would be willing to operate a camera there.

**Safety Investigation**

14. The next step is to undertake a thorough investigation of each potential site to check whether any other appropriate remedial measures should be carried out first. These may include engineering measures such as improving the junction/road layout, anti-skid surface treatment, checking whether signals are obscured by vegetation, checking the signal phasing, sight lines, etc and where appropriate, taking measures to improve visibility. Again, joint consideration with the police will assist in this process and will help to eliminate any sites at which other factors are more important in causing accidents than non-compliance with the law.

15. Where a site has been identified as one at which speed is a particular problem, an examination of the speed limit signs should be made. It is important that these are clear and legible, including all repeater signs. If this is not the case, they should be improved before cameras are installed. It will also be important to check that the speed limits have been imposed under valid Traffic Regulation Orders which would allow the issue of fixed penalties. Paragraph 2 of Schedule 2 of the Road Traffic Act 1991 will provide discretionary disqualification and obligatory endorsement for contravention of section 16(1) of the Road Traffic Regulation Act 1984 (contravention of temporary prohibition or restriction) if committed in respect of a speed restriction. Thus speeding offences committed by breach of a temporary restriction, for example at road works, will in future carry penalty points.

**Type approval of equipment**

16. The new provisions on the admissibility of evidence introduced by section 23 of the Road Traffic Act 1991 apply only where the evidence is taken from devices which have been type-approved in accordance with that section. Information on the Home Office type approval process is given in the separate guidance issued to Chief Officers of Police. It is important to liaise with the police to ensure that the fixed elements installed by the highway authorities are compatible with the cameras. The interface between the camera and the traffic signal controller must be type approved by the Approvals Section, Traffic Control and Communications Division, Department of Transport, Tollgate House, Bristol BS2 9DJ.

**Position at site**

17. Section 40 of the Road Traffic Act 1991 provides a power (by insertion of section 95A in the Highways Act 1980) for highway authorities to install and maintain, on or near a highway, structures and equipment for the detection of traffic offences.

18. The positioning of cameras at sites is very important. The manufacturers' requirements will need to be followed in order to achieve the standards of accuracy necessary to satisfy legal requirements. Where a highway authority is unfamiliar with installing the equipment, the manufacturer or his appointed agent may need to be consulted about the procedure for installing the street equipment as well as the connections to the traffic signal controller and the calibration of devices. A full survey of the junction should be carried out, including distances from the camera to 'stop lines' and junction widths. Carriageway markings should be clear and accurately surveyed. They will also need to be well maintained.

19. Cameras should be sited where there is the least risk of vandalism (e.g. not near a structure which would allow easy access to the camera or housing), and also the least risk of them accidentally being struck by vehicles or causing an obstruction to pedestrians. Care will be needed to ensure that the camera housing does not obscure any existing traffic signs (or if it would do, that these can be relocated to a suitable position), and in particular does not obscure the motorist's view of the traffic signal itself. A reliable continuous power supply is essential for operational requirements and for monitoring (see paragraphs 28-31 and the Annex).

**Ratio of Cameras to Housings**

20. The ratio of cameras to housings will depend partly on the number of sites identified in an area at which the highway authority consider the use of cameras would be cost-effective in helping to reduce accidents. Experience to date at urban sites has shown that one camera can be used effectively at several
sites, provided it is moved frequently between them. The use of dummy flash units at housings which are
temporarily unoccupied should be considered as a means of enhancing the deterrent effect. Dummy units can
record the number of infringements, and thus help monitor driver behaviour.

Publicity

21. Every effort should be made to publicise the introduction and use of cameras in an area. However, it is
not advisable to identify specific sites at which the cameras will be in operation as this would tend to reduce
the overall deterrent effect. Local authorities themselves are best placed to decide what form of local
publicity is most effective; local newspapers and regional media (TV, radio etc) are likely to show an interest
in these initiatives. The opportunity should be taken to emphasise the road safety objectives of camera
technology, as well as to enhance the deterrent effect through this publicity. Public awareness and
understanding of the purpose of improved enforcement, in particular the potential for accident savings, will
lead to greater acceptance of the need for such devices and, therefore, improved compliance.

Signing

22. The Department of Transport is at present monitoring the effect of experimental traffic signs in
warning drivers of the use of enforcement cameras. The aim is to establish a strategy for the use of signs on
an area basis which can be shown to enhance the deterrent effect on motorists. The signs are not intended to
identify individual sites as that would restrict the effect of the cameras to those sites. Pilot schemes are in
progress at present. The results of trials are expected shortly and the Department hopes then to be able to
issue further guidance to highway authorities. This will include advice on the siting and density of the signs
based on the trial results.

23. A standard design of sign will be authorised to ensure consistency. In the interim, highway authorities
should note that unapproved signs must not be used. The fact that approved signing is not currently available
places greater emphasis on the need for other forms of publicity.

Financial Arrangements

24. As a general rule, it is considered appropriate for highway authorities, who have the powers to install
and maintain the equipment, to be responsible for meeting the costs of installation (i.e. the road works
elements, poles, connection to the traffic signal controller equipment, housings, cables etc).

25. As the police will be responsible for the day-to-day operation of the cameras they will normally be
expected to meet the cost of purchasing and maintaining them. This advice is not intended to preclude any
different financial arrangements being agreed locally between the police and highway authorities. It is
important for authorities in England to note that only the installation of the devices will be eligible for
Transport Supplementary Grant (TSG) support (see below).

Transport Supplementary Grant (England)

26. The Department of Transport's Local Authority Circular 1/91 (5 April 1991) gives guidance to local
highway authorities in England on drawing up their Transport Policies and Programmes (TPPs) and explains
how the Transport Supplementary Grant (TSG) system will operate in 1992/93. Paragraph 55 of that Circular
indicates that the Department would consider for TSG support planned expenditure on local safety schemes
whether or not on roads of more than local importance, including the cost for installing red light cameras
provided by the police at junctions where accidents have been caused by drivers not obeying the traffic
signals. Consideration will also be given to similar expenditure on the installation of fixed rate site speed
cameras, where these are justified by the level of speed-related accidents. Such expenditure falls within the
minor works block. In determining expenditure to be accepted for TSG, the Department will, as with other
local safety schemes, consider carefully the road safety benefits and will take note of the authority's Road
Safety Plan, and, in subsequent years, of its spending record and effectiveness in reducing casualties.

Financial Arrangements (Wales)

27. The financial arrangements in Wales differ from those operating in England. In Wales the costs of
installation will be met from either revenue or capital unhypothecated resources.
Monitoring and Evaluation

28. Highway authorities will be expected to monitor and to assess the effectiveness of the use of cameras on driver behaviour and in reducing accidents. This will not only provide valuable management information for their own purposes but should also be taken into account in considering the expansion of their use in future years and in the Road Safety Plan. An analysis of the results of such monitoring should also be included in future TPP submissions. The Transport and Road Research Laboratory (TRRL) is monitoring the use of cameras at a number of sites in addition to the evaluation of the use of area signing referred to above.

29. The primary objective of monitoring is to ensure that any installation of traffic light or speed cameras is operating most effectively, and producing the maximum possible benefit to road safety. In addition, results from a range of different installations will contribute to research by TRRL to determine the best ways of using traffic camera technology. It is possible that the effectiveness of any camera installation may decrease in time as drivers become familiar with its location; a well-designed programme of monitoring should detect this and enable counter-measures to be taken.

30. Three designs of monitoring study are in general possible: a before and after study at each camera site, a comparison between the camera site and one of several control sites, and time-series monitoring. Any of these types might be most appropriate for particular sites. In addition, it may be an objective to discover over what area the effects of cameras extend, in which case data should be collected at several locations within the expected zone of influence.

31. Some points to consider in monitoring traffic light and speed cameras are set out in the Annex to this Circular.

Manpower and Resource Implications

32. The measures outlined in this circular, which are optional, are estimated to increase expenditure by local highway authorities by up to £1m per year for a 5 year period. Expenditure by local highway authorities in England will, however, be eligible for TSG and credit approvals from the Department of Transport (see paragraph 26). There need be no additional manpower implications for the authorities as the resources should enable more effective use of existing staff effort.

Conclusion

33. Enquiries on the content of this circular should be addressed to the Department of Transport, Road Safety 1 Division, Room C18/21, 2 Marsham Street, London SW1P 3EB (telephone: 071-276-6554). Requests for extra copies should be addressed to the Department of Transport, NGAM 3 Division, Room 3/11, 2 Monck Street, London SW1P 2BQ (telephone: 071-0276 2730). In Wales, enquiries should be directed to RE (Gen) 6, Welsh Office, Highways Directorate, Phase 1, Government Buildings, Ty Glas Road, Llanishen, Cardiff CF4 5PL (telephone: 0222 761456 Ext 5251).

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REFERENCES

1 Transport and Road Research Laboratory: Unpublished report.

MONITORING AND EVALUATION OF CAMERA SITES

General Monitoring Requirements

Accidents

It is unlikely that the accident history of any camera site is known and was used in planning the deployment of cameras. To determine the effect of cameras on accident rates it is recommended that at least 3 years' records of all types of accidents be collected both before and after cameras are installed. Accidents should be classified consistently throughout. Police records of injury accidents are probably the most consistent, and should preferably include a classification for each type of accident that cameras are intended to reduce. These might include “right-angle collision” or "disobeyed Automatic Traffic Signal” or “pedestrian” at junctions, and “excessive speed” at speed camera sites.

A "regression to the mean" effect can be expected if too short a monitoring period is used, especially at sites chosen for cameras because they had the highest accident rates; such rates would be likely to diminish in time even without the installation of cameras.

Traffic Flows

Traffic flows should be measured at least hourly for a suitable period at all monitored camera sites. At traffic light camera sites the number of red light runners should be expressed in relation to flow, while at speed camera sites the flow will indicate when free-flow conditions obtain or when congested conditions constrain vehicle speeds. The number and length of red phases should also be taken into account as the opportunity for red running will depend on these factors.

Publicity and Signing

Publicity (in local radio, TV and press) about traffic cameras and their use may be expected to affect drivers' behaviour. Monitoring of camera installations should therefore include a record of the extent and type of any publicity and signs directed at motorists or the general public. The separate effects of signs, of publicity and of the cameras themselves can only be assessed if they are implemented, and monitored, separately.

Traffic Light Cameras

The key data to be collected are:

- Number and percentage of vehicles running a red light (classified by time into red, time of day, lane and direction of approach): this can be done by analysing video film showing the appropriate junction and traffic signals. This can also be done using the camera itself, with the red time set to zero; some cameras can also record traffic flow.

- Number of offenders (classified by time into red) detected by the camera; this should be available from the police.

- Traffic signal cycles; number and cycle times should be collected, as they may vary before and after.
**Speed Cameras**

The key data to be collected are:

- Distribution of vehicle speeds (classified by speed to 5mph, type of vehicle, vehicle flow, time of day and lane); this will need dedicated speed surveys for an appropriate period of time.

- Number of offenders at camera site (classified by speed and time of day). The camera may be set at one or several cut-off speeds for survey purposes; police data should also be available.

**Evaluation**

The results of monitoring can be used to evaluate a scheme using traffic cameras. A full evaluation should take into account an estimate of accident savings and the capital and operating costs of the camera system. (No credit should be given for time savings gained by drivers who exceed legal speed limits).