



TRAFFIC ADVISORY LEAFLET ITS 6/03

Access Control

This leaflet is one of a series of documents from the ITS Assist Project. ITS Assist is a Department for Transport (DfT) initiative that aims to encourage and promote across the UK the use of Intelligent Transport Systems (ITS) as tools to implement local transport policy objectives.

Access Control is a traffic management tool that restricts certain classes of traffic from entering a particular zone or area during specific periods. Access Control can be implemented using technologies known as Intelligent Transport Systems (ITS). This document provides an overview of the means by which local authorities can control access into a zone or area and the benefits which can be achieved.





Rising bollards in Cambridge

BACKGROUND

Many towns, cities and rural tourist areas such as National Parks are facing growing levels of traffic congestion, which is threatening their commercial viability, and the quality of their environment. Consequently, the recent Government White Paper¹ recommends that authorities should review how best they can respond to this growth in traffic. Access control is one method of managing this. Other measures, which could be used, include congestion charging, parking management and management of deliveries to premises in the area. People can also be encouraged to vary the time of their journey to avoid peak periods or to use telephone services to conduct their business.

Highway Authorities can also reduce vehicle use by promoting and providing attractive public transport alternatives and by giving priority to and encouraging cycling and walking.

Where access into an area or zone is to be controlled, advance signing, providing information about the zone affected and its hours of operation, can influence the public's

choice of mode, route and time of travel into the zone.

Before the controls come into force, the authority should provide traffic management measures that provide and sign adequate diversion routes around the zone, and alternatives to car travel within the zone. The entry points into the zone have to be designed carefully so that they are easily recognised by drivers, environmentally appropriate, and provide suitable escape routes.

SYSTEM DESIGN

Control at entry to the zone or across sectors within the zone can be provided by one or more of the following control techniques:

- Permitted list or electronic tag systems backed up by effective enforcement.
- Physical barriers such as a lifting arm barrier or rising bollards.
- Traffic signals with appropriate signing that are operated by a variety of vehicle recognition systems. These signals are enforced by red light enforcement cameras.

AVAILABLE TECHNOLOGIES

Technologies that are used to implement access control include:

- i) Video based systems using Automatic Number Plate Recognition (ANPR) devices in conjunction with a permitted list.

In these schemes, the authority maintains a list of vehicles permitted to enter the zone. An ANPR system, located at entry points and at other locations within the zone, reads the vehicles' number plates and compares them with those on the permitted list. If an unlisted vehicle enters the zone, the authority ascertains the registered keeper's name from the DVLA and issues them with a penalty charge notice.

In certain road user charging schemes, where drivers pre-purchase the right to enter a zone and are added to a maintained list, it may be possible for the register keeper to pay retrospectively to avoid a penalty charge at any time during the day on which entry into the zone occurred.

Although ANPR technology can anecdotally only achieve a recognition rate of number plates of between 80-90 percent, vehicles will usually pass a number of such

installations so the chance of a driver avoiding detection is low.

ii) Non-stop Road Charging Techniques

These systems provide charge per use or season ticket recognition without the need for the vehicle to stop as it enters a controlled zone.

One possible method for collecting payment uses roadside devices that communicate, as the vehicle enters a zone, with electronic tags or smart cards mounted on vehicles, deducting the appropriate fee or recording details for future billing.

If a vehicle is not recognised as permitted to enter the zone its number plate is captured using an ANPR system, and a penalty notice issued.

iii) Barriers and Bollards

Lifting barriers or rising bollards can be operated by a number of technologies such as:

- A mechanical key switch
- A magnetic or smart card manually inserted into a roadside card reader or passed by a contactless card reader on the roadside
- A bar code sticker on the vehicle and a bar code reader on the roadside
- An electronic device on the vehicle and a roadside reader
- A tag or transponder on the vehicle that interacts with an inductive loop detector in the carriageway
- Inductive loops detectors capable of selective vehicle detection.

Bollards and barriers that prevent the passage of vehicles can be installed on a carriageway legally if backed with an appropriate traffic order. Advance signing has to be provided.

There are, however, some drawbacks to these systems. For example, vandals can easily break lifting arm

barriers, and both barriers and bollards can fail in a closed or semi-closed position. Remote monitoring of the sites is advisable together with a rapid response service to rectify faults. Means must also be provided for the emergency services to raise the barrier or to lower the bollards manually.

Other problems can arise when the barrier or bollards are being raised or lowered or when two or more vehicles attempt to pass through the entry point in close succession. Careful thought has to be given to the assessment and investigation of such risks. Advice on this subject is given in the DfT Traffic Advisory Leaflet 4/97².

iv) Traffic Signals and Signs

Traffic signals, operated by the same technologies listed for barriers, can also be used to control vehicles entering an area or passing through an area. In these cases, camera enforcement systems can identify those vehicles that pass the traffic signals at red.

Traffic signals can also be employed to regulate entry flows to sections of motorway in order to prevent congestion on the main carriageway. This technique is known as ramp metering.

A similar technique can be employed in urban street networks to ensure that queues at junctions do not extend so that they interfere with upstream junctions. Traffic signal timings of junctions upstream of the potential queuing problem are reduced to regulate flows into an area and form queues in locations where they will not cause problems. This technique is known as queue relocation.

IMPORTANCE OF INTEGRATED SYSTEMS

Access control systems should be integrated with other systems that make up an urban traffic management and control system.

For instance:

- The systems used for the enforcement of the zone and for issuing penalty charge notices should be integrated with those for the authority's parking management systems and potentially into car park booking systems.
- Advance information regarding the zone can be given using the authority's variable message signs and traffic and travel information systems.
- Timings in the urban traffic control system may need to be adjusted to take account of the operating times of the controlled zone.
- The authority's CCTV systems can be used to monitor the entry points into the zone.

REPORTED BENEFITS

Results from schemes in several European cities funded by the European Commission have been reported by Miles et al³ as follows:

- Four wheel vehicle entry to the restricted zones was reduced by between 33-78 percent.
- In general traffic delays were reduced and in one case by 18 percent.
- Emissions were reduced considerably.
- Drivers were persuaded to change their mode of travel by using public transport, riding powered two wheelers or cycles, and walking.
- The schemes were generally supported by residents inside the zone.

EVALUATION

It is recommended that authorities investing in such systems monitor and evaluate their operational performance in accordance with the Guidance on Local Transport Plans produced by the DfT.

FURTHER INFORMATION

The following references provide further information about some of the topics discussed in the text.

Standards

TR 2007 Issue (a) - Rising Bollard Systems
TR 2211 Issue (a) - Specification For Rising Bollard Systems

Related Documents

UTMC Performance Criteria for UTMC Systems. Handbook and Technical Notes. (Refer to: www.utmc.dft.gov.uk)
ERTICO City Pioneers – ITS Toolbox. Intelligent City Transport. ITS City Pioneers Consortium.
Guidance about the Local Transport Plan Process can be found at:
www.local-transport.dft.gov.uk/index.htm#ltp

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To find out more about the wide range of ITS-related initiatives and projects supported by DfT, and the development of ITS policies to encourage and promote greater deployment of ITS, please contact Transport Technology and Telematics division of the Department for Transport at: its@dft.gsi.gov.uk

REFERENCES

- ¹ Department for Transport. A New Deal for Transport: Better for Everyone. London. The Stationery Office July 1998.
- ² Department for Transport. Traffic Advisory Leaflet 4/97 Rising Bollards.
- ³ Access Control in City Centres: Objectives, Methods and Examples. Miles J, Walker J, Macmillan A, Routledge I. Traffic Engineering and Control, December 1998.

DfT WEBSITE www.dft.gov.uk

Details of Traffic Advisory Leaflets available on the DfT website can be accessed as follows:

From the DfT homepage, click on the Local Transport icon and then on Traffic Advisory Leaflets. Lastly, click on one of the themes to view material.

The Department for Transport sponsors a wide range of research into traffic management issues. The results published in Traffic Advisory Leaflets are applicable to England, Wales and Scotland. Attention is drawn to variations in statutory provisions or administrative practices between the countries.

The Traffic Advisory Unit (TAU) is a multi-disciplinary group working within the Department for Transport. The TAU seeks to promote the most effective traffic management and parking techniques for the benefit, safety and convenience of all road users.

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