CURRENT ISSUES IN TRAFFIC CALMING PRACTICE

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Introduction

Traffic calming has become, in the early 1990s, an increasingly popular and widespread technique for reducing the adverse effects of motor traffic in urban areas. Other north European countries, especially Denmark, Germany and the Netherlands, have been developing and implementing traffic calming for fifteen years or more, while activity in British towns and cities has been gathering pace in the early 1990s. The main impetus behind traffic calming in Britain has been the desire to secure a reduction in road casualties, reinforced by the national target of a third less accidents (from the mid 1980s average) by the end of the century.

Traffic calming is now demanded by more and more communities to the point where local authorities cannot keep pace. The earlier impediments of over-rigid speed hump regulations and inadequate power to install other speed reduction measures have largely been removed following the 1990 Road Hump Regulations and the 1992 Traffic Calming Act. There remain, however, issues concerning design and funding, especially for the environmental element of schemes, and the role of traffic calming within transport and development strategies.

This paper reviews some important issues which have emerged from European practice, and suggests a strategy for comprehensive traffic calming in all built-up areas.

More than accident reduction?

Traffic calming as developed in the Netherlands and Germany is more than just traffic management, or accident remedial work. Traffic calming is seen as a total design technique for meeting a variety of objectives, not just accident reduction. (For discussion of this wider range of objectives see Ref 1.)

An issue frequently raised in Britain is whether "environmental" treatments can be justified in addition to basic humps, chicanes and other speed reduction measures. Experience from the near continent suggests the following tenets of sound traffic calming practice:

* Landscaping, paving and other environmental treatments will not, by themselves, have sufficient effect on driver behaviour and speed to achieve the casualty reduction and other objectives required.

* Such improvements can, however, reinforce the speed reduction and calm

driving effects of other measures such as humps and lateral shifts. This requires a change in the character and appearance of the street.

* Environmental improvements can be important, or even essential, in getting public support for the traffic calming measures.

The "Badminton Trials"

The effect of a major change in street character on driver behaviour and acceptance of traffic calming measures was demonstrated in Essen in the 1970s (Ref 2). The demonstrations used badminton players in the street before and after the introduction of traffic calming measures and environmental works. The results were as follows:

BEFORE

- Drivers approached the badminton players fast, and braked late, expecting the players to move aside.
- 24% of drivers sounded their horn to get the players to leave the carriageway.

AFTER

- Drivers approached the badminton players more slowly, and with preparedness to slow down further.
- Only 11% of drivers sounded their horn.

The conclusion was that drivers show less aggression and much greater tolerance of activity in the street when the appearance of the street has been changed to reflect priority for residents and pedestrians.

Beyond shared spaces

The shared space solution (developed in the Netherlands in the 1970s as the Woonerf principle) can produce safe and attractive living areas. The special traffic rules for such areas include pedestrians' rights over the entire street surface, parking at specified bays only, and vehicles to proceed at no more than "walking pace". To meet these requirements it is usually necessary to repave the entire street, and to introduce planting and street furniture on a generous scale. Most European countries have adopted the international shared surface sign but not Britain, where no equivalent traffic rules exist for shared surfaces.

The shared surface solution is now rarely adopted, certainly in existing areas, for several reasons:

- It is expensive to implement,
- Most benefits can be gained more cheaply using 20 mph zone techniques,
- Pedestrians do not always feel secure without dedicated footways, even though accident rates are very low (German schemes now retain footways for this reason),
- It works only with low traffic volumes (maximum about 200 vehicles per hour), so cannot be a universal solution.

- Shared surfaces can become cluttered with parked vehicles in areas of high parking demand.

The shared surface continues to be used in new UK housing developments, but it is often poorly designed and with the effect of giving priority to the car.

The clear lesson from continental experience is that shared surfaces can be valuable in limited circumstances, but that universal traffic calming must rely on 20 mph techniques. The 20 mph zone (and its 30 kmh continental counterpart) is now seen as the most appropriate action for large scale area-wide traffic calming, though lengthy Department of Transport procedures mean that many local authorities do not bother to seek formal 20 mph zone designation, even where schemes meet the technical requirements.

Main road traffic calming

The biggest prizes are to be won on main roads. Most traffic calming effort has been concentrated in residential areas, and this has produced important accident reductions, especially amongst children. But it is main traffic routes where conflicts are most intense, and where a substantial majority of all urban accidents occur.

Experiments in 11 village through roads in Germany produced generally favourable but rather mixed results. Vertical shifts were not used in any of these schemes, and speed reduction was modest. Lateral shifts were effective only where these were severe. Similar results were obtained from Denmark's through road schemes. The relative effectiveness of different speed reduction measures is summarised in Devon County Council's "Traffic Calming Guidelines" (Ref 3). Further research is now being undertaken of through road schemes in Britain (Ref 4).

France is unusual in that most traffic calming effort has gone into urban main roads and through roads in small towns and villages, rather than residential areas. This stems from the relatively scattered distribution of settlements over a large geographical area, and the impossibility of providing by-passes for the thousands of towns and villages lying astride Routes Nationale and other important roads. The French government embarked on an ambitious programme of 50 demonstration projects in the mid-1980s, a majority of which were on through-roads (Ref 5). Main road traffic calming, including the use of humps, chicanes and roundabouts, is now common in most parts of France.

There are now numerous continental schemes, but most of them have relied on reallocating space, rather than more direct methods of speed reduction. Examples are to be found in Amsterdam, Eindhoven (Netherlands) and Berlin, Buxtehude, Cologne, Frankfurt, Hennef, Herne and Langenfeld (Germany). The latter two schemes have made particularly good use of "cushions" to reduce speeds for general traffic without interfering with bus operation (Ref 6). Perhaps the boldest scheme in Europe, however, is to be found in Borehamwood, Hertfordshire, where average speeds of 20 mph have been achieved on 600 metres of "A" road carrying 18,000 vehicles per day. The techniques include flat-topped humps which help shoppers to cross, mini-roundabouts, and a divided two-lane carriageway.

Priority to the right or left

It is common in continental Europe for priority to be given to vehicles entering or crossing one's direction of travel, ie. priority to the right. This rule these days is usually suspended on main traffic routes where priority markings and signs are displayed. There is no equivalent (priority from the left) rule in Britain, where the only priority given to traffic joining one's direction of travel is at roundabouts. The mini roundabout as a result has become an important traffic calming tool.

The absence of any priority to the left rule in Britain deprives us of a useful speed reduction technique. Often in continental schemes, the simple removal of priority markings at junctions has had a dramatic effect on vehicle speeds, equivalent to the effect of a speed hump but without any cost. Valuable though a new "priority to the left" rule in Britain would be to add to the traffic calming toolkit, it could be difficult to introduce given that drivers have no experience of it. There might be a case for experimentation, however.

Legal limit only, or physical measures?

Although a large proportion of residential streets in Danish, German and Swiss cities are now subject to the 30 kph speed limit, in many cases this is not backed up by physical measures to make the limit self-enforcing. There has been some success in terms of accident reduction from this lowering of the legal limit alone, but we cannot assume that such success would follow the application of this approach in Britain. We must remember that people in the countries mentioned have become used to lower speed limits, and there have been campaigns to promote traffic calming for over fifteen years. In addition, certainly in Germany, traffic laws tend to be respected more than in Britain.

The Department of Transport, quite rightly, have insisted that 20 mph zones should be designated only where average vehicle speeds are 20 mph or less, and in most places this can be achieved only by the use of physical measures.

Nevertheless, as awareness of the dangers and problems of speed in towns grows, and as people gain experience of 20 mph areas, and understand their purpose, it should be possible to relax this requirement. It should be possible in the longer term to introduce 20 mph zones where physical measures are used selectively to reinforce speed reduction at locations where the greatest benefits can be gained (eg. at junctions, and outside schools), rather than the blanket use of humps or other measures as at present.

Autonomy for local authorities or central regulation?

There is no doubt that many good ideas in traffic calming have come from local authorities who have been able to devise techniques without fear of legal or other challenge. There is also no doubt that some very poor schemes have resulted from local autonomy. There are potentially great benefits from encouraging good practice through conditional grants (as in the Netherlands), or by investment in major demonstration projects to research the best techniques (as with the 6 German Federal area-wide projects, and projects by Landes Northrhine-Westfalia). Standard bus chassis design in Germany has proved to be a useful

asset in the design of "cushions".

Central regulation (as in Britain) is therefore potentially useful in getting widespread adoption of effective techniques, but of course such regulations must be aimed at promoting, not limiting, action, based on properly conducted research, and supported with adequate funds.

Traffic calming as part of transport strategy

It is recognised in many cities that traffic calming can help to regenerate the economy of city centres and sub centres, and can also help to moderate demand for the private car. Traffic calming can thus be part of a wider strategy for strengthening urban areas, and fighting off pressures for car-based out-of-centre developments. All but one of the six German area-wide demonstration projects showed positive improvements for local trade. More widely, a study of 30 German cities found higher retail growth rates amongst those cities which had lower parking provision in the city centre (Ref 7).

Traffic calming can also be an important way of avoiding future traffic growth, for example by preventing the increased use of rat-runs through residential areas as traffic congestion increases on the main road network. This approach has been included in strategies for South Birmingham (Ref. 8) and the London "Priority Route" strategy (Ref. 9).

A more negative view has been sometimes been expressed that traffic calming has been used as a "green smokescreen" to placate environmentalists while the trend of increasing motorisation continues uninterrupted (Ref 10). The present author agrees that traffic calming does not tackle the issue of excessive motor traffic. Strategies for traffic reduction, however, should include traffic calming, and will make safety and environmental improvements easier to achieve (Ref 11).

The prospect of comprehensive traffic calming

The benefits of traffic calming are now well established. When driving speeds are kept below 20 mph, we can expect a halving of serious accidents involving personal injury. Even using narrow cost-benefit criteria for schemes, this saving in accidents is sufficient to justify traffic calming on the great majority of built-up roads. The logical outcome is therefore to propose comprehensive traffic calming on all roads except those without frontage activity, in order to get the maximum accident reduction possible. We now have the technology to make serious injury and fatal accidents in urban areas a very rare occurrence, without losing the benefits of motorised travel.

A model of comprehensively calmed towns is given in the Devon Traffic Calming Guidelines. This consists of all residential access and distributor roads having 20 mph or sub-20 mph speed limits (about 85-90% of urban road kilometres). The former Minister for Roads, Kenneth Carlisle, stated publicly that in his view about 80% of urban roads are suitable for conversion to the 20 mph speed limit. On main roads, two approaches are advocated. Where main roads pass through shopping and other areas acting as a focus for the local community, traffic calming would ensure that the through traffic function did not dominate other activities in the street. That is, priority would be shared between traffic

and other activities. Such areas might constitute 10% of the main road network. The majority of the main road network would retain the 30 mph limit but would be redesigned where necessary to protect vulnerable traffic participants (eg. pedestrians and cyclists).

Questions that arise from this scenario are:

- Is it feasible?
- Can we afford the necessary measures?
- How long will it take to complete?
- Are there alternative approaches?

Cost

Comprehensive calming for all built-up roads on the lines suggested could cost in the region of £5 Billion, or around £100 per head. This could be funded without extra money under the transport heading, if spending priorities were shifted away from capacity provision to improvement of urban street environments. For example, diverting 25% of the Trunk Road budget to traffic calming would be sufficient. In cost-benefit terms, the accident reductions alone would ensure the investment was repaid before the programme was completed, and would yield a substantial "return" thereafter. There would be other benefits to add to this as well.

Nevertheless, the cost of achieving self-enforcing speed reduction measures on all urban roads is becoming difficult to sustain even in those countries that have been the strongest proponents. In Germany the pressures on public expenditure created by re-unification have meant a fairly drastic re-appraisal of traffic calming policy. Comprehensive physical measures are now being replaced by more emphasis on publicity and social awareness campaigns, together with the 30 kph (20 mph) speed limit over wide areas. Physical measures are used selectively, for example at sensitive locations like school entrances. In the Netherlands, as in Britain, the lower speed limit must be accompanied by self-enforcing measures, but the government pays half the cost.

Timescale

With adequate diversion of funds and planning and engineering expertise, comprehensive calming could be achieved in 10-15 years. This will, however, require immediate and sustained political commitment. Traffic calming will also need to become part of wider strategies for traffic and planning rather than remain (as at present) a piecemeal response to accident problems. Local authorities are increasingly making budget provision for traffic calming. Central Region in Scotland is a notable example where a policy shift away from road provision has been matched by a shift of money away from roadbuilding to traffic calming (Ref 12).

Alternative approaches

Areas of debate in other European countries include the appropriate balance between traffic calming and other transport expenditure; how best to integrate safety with other traffic calming objectives; and the relative merits of public education, legal provisions, and physical street reconstruction.

A further possibility, which has so far received little attention outside the German State of Northrhine-Westfalia, is the possibility of switchable vehicle speed-governors. Prototype vehicles with a switchable maximum speed and acceleration were successful in trials (including the official car of Christof Zoepel, former NorthRhine-Westfalia Minister for Transport). The driver switched over to 30 kph operation when entering a 30 kph zone, and back to 50 kph when leaving. Outside towns the car was switched to "no restriction" mode. Although the prototypes were manually operated, it would be possible to connect the switch to external lights on the vehicle for enforcement purposes. A further development would be automatic speed switching using beacons at the speed zone boundaries to trigger the mechanism within the vehicle. This would be a further area of research towards the "intelligent vehicle and road", and could be pursued with road pricing and other developing technology.

The great advantage would be the removal of any need to install humps or other measures whose sole purpose is to force drivers to slow down. With speed automatically managed, traffic calming would focus more on layout and design objectives.

CONCLUSION

Mainland European countries are 10 - 15 years ahead of Britain in the development and application of traffic calming, and in public awareness of its value. Nevertheless, while there are many excellent schemes, there is still a reluctance in most places to exploit the full potential of traffic calming techniques. Residential areas need more widespread physical measures to enforce low speeds, and to create the required change in street character "to return the streets to the people". On main roads in towns and villages, much bolder experimentation is needed with speed reduction measures, especially vertical shifts.

The really crucial, and highly visible, difference between traffic calming schemes in Britain and countries on the near-continent is in the quality of design and construction. Dutch and German schemes in particular often reach astonishingly high standards of paving, landscaping and detailing. This reflects a much greater respect for the urban environment and public spaces. British urban areas by contrast often look shamefully neglected. A revival of urban design and investment in the renewal and maintenance of public areas is long overdue.

The benefits to be gained from traffic calming are inversely proportional to the volume of parked and moving vehicles in a given area. It is therefore important for traffic calming to be developed in the context of wider strategies for urban traffic reduction.

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