THE USE OF SMALL ELEMENT PAVING AND CONCRETE BLOCK PAVING IN TACTILE AND TRAFFIC CALMING LOCATIONS IN THE UNITED KINGDOM

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ABSTRACT.

The Street Environment is, nowadays, a very important part of city and town life. The rejuvenation of many town centres and the development of purpose built shopping centres makes us all aware that we must allow pedestrians the freedom to walk around in safety. As a nation the car and our transport infrastructure is very important but there is now a recognition that the car is not king and that measures must be introduced to reduce the speeds of vehicles and limit their access in designated areas.

This paper will look at the history and development of tactile paving and gives guidance on the utilisation of these products, so that people of all abilities and disabilities may use and enjoy our street environment. We will also look at the rapid development of traffic calming schemes, the regulations which govern them and the various different types of road configurations, available to the designer, which will enable successful schemes being implemented into the environment.

Examples will show that precast concrete products have been successfully used in these applications.

1. TYPES OF TRAFFIC CALMING MEASURES

In the UK, when the Highways (Traffic Calming) Regulations 1993[1] were passed it gave local authorities due necessary powers to construct, in the highway, a number of particular measures which were required for traffic calming purposes. The measures have been segregated into several different features which are described below and can be used as a feature separately or in conjunction with one another.

1.1 Build-out

This is a feature which extends into the carriageway on one side of the road only. It narrows the road so that traffic will only be able to pass through the build-out one vehicle at a time. For the narrowing to be effective there needs to be a sufficient opposing traffic flow but when it is combined with a road hump or speed cushion then very effective speed control is obtained. A series of build-outs along one side of the road can also be used to provide sheltered parking spaces. Photograph 1.

1.2 Pinch points

These are is created by constructing build-outs opposite one another. It is an effective speed

control device when it is combined with other features such as a road hump or speed cushion. Traffic will only be able to pass through the pinch point one vehicle at a time. If the carriageway has been raised at this point then it also provides a place for pedestrians to cross in a conspicuous manner and should be indicated. Photograph 2



Photograph 1. Build out



Photograph 2. Pinch point

1.3 Chicane

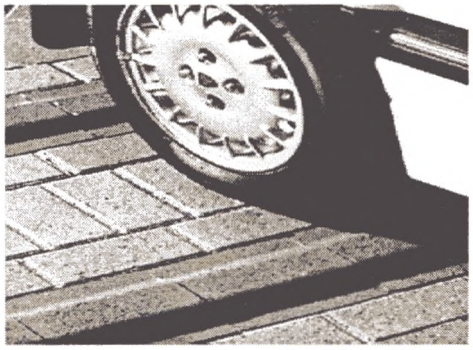
Chicanes are formed by constructing build-outs alternatively on each side of the carriageway, each chicane consisting of two or more build-outs. It is important to space these build-outs at the correct points. Build-outs constructed 10-18 m apart can be extremely effective in constraining drivers' speeds, however buses and other larger vehicles find it more difficult to manoeuvre through the chicane so a compromise should be sought. Wider spaced chicanes rely more on opposing traffic to provide effective speed control. If pedestrians are likely to cross at a chicane, the device should ensure that they can be seen clearly and that they can cross the road safely.

1.4 Rumble devices

These include features such as rumble strips, rumble areas and jiggle bars. Rumble devices are textured road surface treatments which are designed to cause noise and vibration within the vehicle being driven over the device. For general use on public highways these devices must not exceed 15mm in height and no vertical face shall be greater than 6mm. Rumble devices should be placed across the full width of the road and should be constructed in a contrasting colour from the road surface. Photograph 3. White marking paint should not be used to avoid confusion with road markings.

1.5 Gateway

Gateways are used to indicate to drivers that the road ahead changes in character e.g. at the start of a traffic calming scheme or at the entrance to a speed limit zone or 20mph area. A gateway features structures at the side of the road and in some instances also above it. A gateway in its self is not necessarily a speed reducing feature but it can be used in combination with other measures such as pinch points, rumble strips, traffic signs etc.
Photograph 4.



Photograph 3 Rubble strip



Photograph 4 Gateway

1.6 Overrun areas

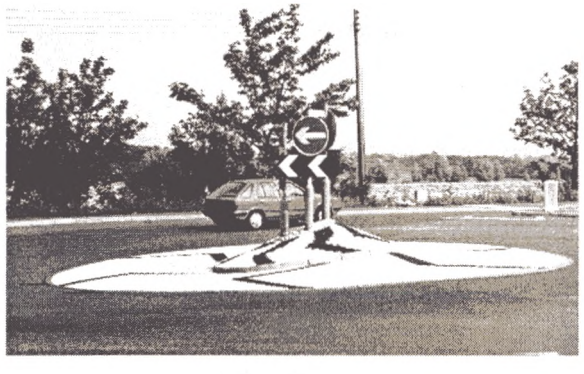
These are to create the appearance of a narrower carriageway in order to inhibit speeds. The areas are usually constructed in a contrasting colour or take the form of a raised surface. This allows drivers of larger vehicles to overrun these areas, to negotiate the traffic calming feature. Photograph 5.

1.7 Traffic islands

Traffic islands are effective in reducing speeds but they do depend on the degree of deflection attained. To allow the passage of larger vehicles, overrun areas can also be incorporated. This encourages greater deflection of smaller vehicles but allows passage of larger vehicles.

1.8 Median

This is a section (usually longitudinal) of hard or soft landscaping constructed within the carriageway, the vehicles having to pass on either side of the feature. It reduces vehicle speeds by means of narrowing the width of the carriageway. As it splits the traffic flow, it also creates an easier and safer point for pedestrians to cross the road. Photograph 6.



Photograph 5 Overrun areas



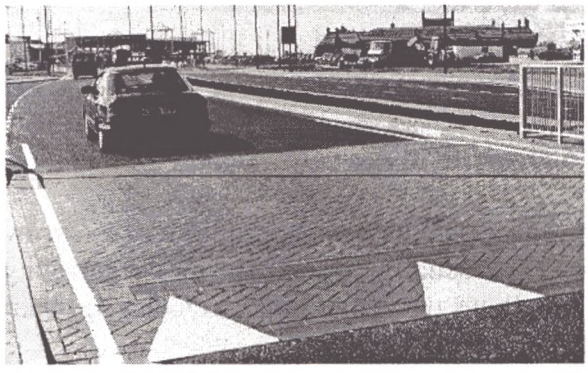
Photograph 6 Median

1.9 Road hump

These are defined as a raised hump built in the carriageway to specific dimensions. The hump can either be continuous over the width of the carriageway or it can stop short of the kerb to allow a drainage channel to be left on both sides of the hump. A slightly larger gap may be left for cyclists to manoeuvre through the feature. Its function is to slow down vehicles travelling along an existing road which is subject to high speeds or used to deter extraneous traffic ie:- on a route used as a rat run. Photograph 7,8,9 and 10.



Photograph 7 Road hump



Photograph 8 Road hump



Photograph 9 Road hump



Photograph 10 Road hump

1.10 Speed cushions

These are an alternative to a road hump which is gaining favour with the emergency services of fire, police and ambulance, along with transport companies is the speed cushion.

A speed cushion is designed to reduce speeds of cars but allows undisturbed passage of wider tracked vehicles such as buses and emergency vehicles. Their larger axle lengths effectively spanning the hump width. Speed cushions are usually installed in pairs one to each side of the carriageway. Photograph 11



Photograph 11 Speed cushion

2 TACTILE PAVING

2.1 Introduction.

In 1981 the Disabled Persons Act[2] was passed by Parliament. The Act required Local Authorities to have regard for the needs of disabled people, in particular at crossing points where the installation of dropped kerbs had to be considered. A dropped kerb in these circumstances is a benefit to wheelchair users, people pushing prams or trolleys and to some ambulant disabled, but for visually impaired people, who rely on a kerb edge for guidance, this could pose a road hazard. As a consequence the Department of Transport developed a tactile surface which warned blind and partially sighted people that they had reached the edge of the footway and that point was a designated crossing area.

The Department of Transport recognised the needs of the visually impaired. The first tactile profile developed was the original rounded dome blister profile for use at controlled crossing locations. For others with various disabilities, such as wheelchair users, people with walking difficulties and painful medical conditions i.e. arthritis, this profile was found to be uncomfortable.

Acknowledging this fact, research was undertaken and the first advice note given by the Department of Transport Mobility Unit[3] was that the rounded dome blister paving should be modified to the now universally approved flat-topped blister profile.

As visually impaired people become more mobile it is important that the information conveyed to them is not conflicting and confusing. Therefore other tactile paving profiles were rapidly developed and these are now being actively promoted for use in many street environments.

2.1 Blister paving

This is intended to be used to provide a warning to blind and partially sighted people to indicate of where the footway ends and the carriageway begins. It is an essential safety feature for this group of people, as previously, the kerb upstand was used to indicate the segregation between the footway and the carriageway.

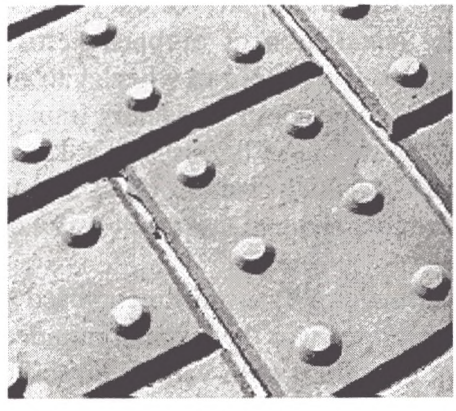
The profile of the blister surface comprises rows of flat-topped 5mm high blisters evenly spaced over the area of the paving. The blister paving should be installed at both controlled and uncontrolled crossing points in situations where the footway has either been dropped flush with the carriageway or where the carriageway has been raised to the level of the footway, as in some traffic calming schemes. It is very important to use the correct blister paving in the correct situation, for example at controlled crossings where the pedestrian has priority over vehicular traffic, the colour of the blister paving should be red. Photographs 12 and 13

At uncontrolled crossings, where the pedestrian does not have priority over vehicular traffic and must make a decision about whether it is safe to cross, the colour of the blister paving should be buff, or any other colour, other than red. Yet again there should be a contrast with the surrounding footway surface.

In conservation areas where dropped kerbs are provided at crossing points then some relaxation of the colour requirements are acceptable. Where the design has to be sympathetic to its surroundings the tactile surface colour should be in harmony with the surrounding material.



Photograph 12 Blister paving - flag



Photograph 13 Blister -block

2.2 Hazard Warning

This paving was developed to warn visually impaired people of the presence of hazards. These hazards take the form of stairs, level crossings or nowadays the approach to on-street light rapid transit (LRT) platforms. The hazard warning paving, occasionally called Corduroy paving it is intended to mean "hazard, proceed with caution".

The surface profile comprises 6mm high rounded bars, 20mm wide and spaced 30mm apart. The bars should run transversely across the direction of travel so that users can detect them clearly and be warned of the approaching hazard.

2.3 Directional guidance paving

Nowadays, in our street environment there are several situations where visually impaired people require guidance along a route. In general this is where traditional guidance cues are not available, such as a property line or kerb edge. The surface has been designed so that people can be guided along the route either by walking on the tactile surface or by maintaining contact with a long cane. The profile comprises a series of raised flat-topped bars which run in the direction of the pedestrian travel. The bars are 5.5mm high, 35mm wide and spaced 45mm apart. Photograph 14

2.4 Platform edge (off-street) warning paving

The edges of all off-street railway platforms can be extremely hazardous and should be indicated by the use of the platform edge warning paving. The profile consists of offset rows of flat-topped domes 5mm high and spaced 66.5mm apart. This measurement is taken from the centre of one dome to the centre of the next. It very clearly indicates that a platform edge is present and great care should be taken. The surface is not the same as the flat-topped blister paving and must not be confused or interchanged. The surface can be any colour, other than red, and should provide a good colour contrast with the surrounding area.

2.5 Platform edge (on-street) lozenge paving

With the development of on-street light rapid transport systems in number of our cities, for example Supertram in Sheffield and the Metro in Manchester, there was a need to develop a profile which would indicate to people that they were approaching the edge of on the LRT platform.

The profile comprises rows of lozenge shapes 6mm high. These have rounded edges in order not to be a trip hazard. Its aim is for use on on-street platforms and not in any circumstances be used on off-street platforms where platform edge paving should be used. Photograph 14.



Photograph 14 Directional and platform edge

2.6 Cycleway paving and central delineator strip

In many towns and cities nowadays there is a move to encourage more use of bicycles. This has entailed the development of cycle tracks and routes, but in many situations these tracks have to be shared with pedestrians. This is a potentially dangerous situation, so segregation is required for pedestrians on one side of the track to the cyclists on the other. The cycleway paving was developed with this in mind, and its purpose is to advise visually impaired people as to the correct side of the track to enter. The central delineator strip, running length ways along the track is to help to keep pedestrians and cyclists on their correct side.

The cycleway paving profile comprises a series of raised, 5mm high flat-topped bars, 30mm wide and 70mm apart. It should be laid at the beginning and at the end of the shared cycleway/pedestrian route, to inform people that they are either entering or leaving the shared facility.

On the pedestrian side the surface should be installed with the bars running at right angles across the direction of travel and on the cyclist side the surface should be laid with the bars running longitudinally in the direction of travel.

The central delineation strip profile is 12-20mm high, 150mm wide with sloping sides and a flat top of 50mm. It is to be used to segregate a shared facility to keep the pedestrians and cyclists separated.

2.6 Information surface

The final tactile surface available, which is the least known, is the information surface. Its purpose is to help people locate local amenities i.e. telephone kiosks, bus stops, ticket offices, tactile information boards, cash dispensers, toilets etc. It is of particular use to visually impaired people who are regular users of a particular area and they will quickly become familiar with the type of amenity indicated.

This information surface does not have a raised profile, as with the other tactile surfaces, but it is detectable because it feels slightly softer underfoot than conventional paving material. The surface should have a matt finish and be slip resistant.

It is very important that local groups of visually impaired should be consulted prior to installation to determine which amenities they wish the surface to indicate.

3 CONSTRUCTION FAILURES, DESIGN FAULTS AND CORRECT DETAILING

As with standard construction of pavements, the construction of these special applications needs the same skills and care. In some applications, the detailing is of paramount importance to the longevity of the pavement. Detailing and design criteria was the subject of a paper at the last Concrete Block Paving Conference , reference can be made to that advice for flat areas of construction.

In designing and constructing platforms there are a few basic rules:-

1. The top of the platform must be longer than the longest vehicle.

2. Use ancillary fitments instead of cutting units.
3. Ensure that there is a reasonable transition between the road and the platform.
4. Allow for drainage around the area of the platform.

3.1 Examples of failure.

The photographs15 to 19 illustrate some of the failures which have occurred on the various locations. The photograph's captions explain the failure type.



Photograph 15 Bad detailing



Photograph 16. Base failure under restraint



Photograph 17 Wrong detailing



Photograph 18 Depression



Photograph 19 Impact damage by underside of vehicles

This form of depression has been caused by ingress of water into the laying course, which becomes saturated, the volume changes and under load the sand thickness reduces and the blocks follow the sand causing these imprints.

4. CONCLUSION

In summary, the street scene can easily be developed to provide adequate facilities for all user groups, be it pedestrians, retailers, emergency services, able bodied. disabled, blind or partially sighted. The features and products discussed can all be achieved with the use of concrete, clay and natural stone along with thought, care and attention to detail. There are many products available today which can improve the pedestrian areas, decrease maintenance costs, and create an aesthetically pleasing environment. So bring your street scene to life, consider the options available.

As with all traffic calming schemes it is imperative that full consultation is undertaken with all the groups affected by the change, such as local police, fire brigade. ambulance service and any local group which represents people who are likely to be affected by the scheme. If at all possible, experimental layouts should be tested to achieve to the optimum speed reductions, minimum noise levels and minimum traffic flow.

References.

1 Highways (Traffic Calming) Regulations 1993. HMSO. London UK.

2 Disabled Person Act 1981. HMSO. London UK.

3 Mobility Unit, Department of The Environment, Transport and the Regions, London UK.