

Traffic Advisory Leaflet 7/96
June 1996



Highways (Road Humps) Regulations 1996

Introduction

Since the Highways (Road Humps) Regulations 1990 were introduced, considerable research has been carried out into the performance of road humps. This has paid particular attention to those types of humps which did not conform to the 1990 regulations, such as speed cushions, and narrow thermoplastic humps known as "thumps".

The results of this work have helped indicate that the very prescriptive nature of the 1990 regulations was unnecessary. As a result, the 1990 regulations have been replaced by the very much simplified Highways (Road Humps) Regulation 1996, leaving the actual design and location of road humps a matter for local highway authorities to determine. Since the Road Humps (Scotland) Regulations remain unchanged, the contents of this leaflet are not generally applicable to Scotland. The advice in Traffic Advisory leaflet 3/91 remains current.

The primary legislation is the Highways Act 1980, sections 90A to 90F, and this remains unchanged. It makes it clear that road humps can only be constructed on roads which have a speed limit of 30mph or less (sections 90A and 90B); contains requirements to advertise and consult the police (sections 90C); and contains the assurance that road humps constructed in accordance with regulations, or specially authorised, or constructed prior to adoption of the highway, are not treated as obstructions (section 90E).

The new regulations provide local highway authorities with considerable flexibility in the design and placement of road humps. However, the regulations make local highway authorities responsible for the design and placement, so authorities will need to ensure that an adequate duty of care is exercised.

Purpose

The purpose of this leaflet is to provide general advice on the use of road humps under the Highways (Road Humps) Regulations 1996. It does not attempt to cover every eventuality, and it is for local highway authorities to ensure that designs do not compromise safety. Previous technical advice issued on road humps is still generally relevant. With the exception of Traffic Advisory Leaflet 2/90 and 3/91 (which contained advice on the previous Road Hump Regulations), information contained in this leaflet is intended to enlarge on, rather than replace, previous advice. This guidance should be read in conjunction with the Highways (Road Humps) Regulations 1996 themselves.

Rumble Devices

The use of rumble strips and rumble areas is enabled by the Highways Act 1980 (as amended by the Traffic Calming Act 1992), and the Highways (Traffic Calming) Regulations 1993. Advice is contained in TA Leaflet 11/93. The maximum height permitted under the Traffic calming regulations for a rumble device is 15mm. Technically, rumble devices with heights larger than this could be specially authorised, but it is likely that in most cases the requirements of the road hump legislation would have effect.

Special authorisations

With the simplification of the regulations there should be very little need for road humps to be specially authorised. An exception would be where a road hump was of a design where its height could be varied mechanically. Special authorisation would also be needed for a hump higher than 100mm or lower than 25mm, though a very detailed supporting case would need to be put forward for any proposal where the road hump exceeded 100mm in height.

Consultation

The requirement in the Highway Act 1980 (Section 90C) to consult with the police and to advertise proposed road hump schemes still applies. In addition, the new regulations require the fire and ambulance services to be consulted, as well as organisations or groups representing people who use the road. This should certainly include bus operators, and residents of the street where the road humps are to be installed. Bus operators need to be consulted not only about roads which have bus routes, but also on adjacent roads, so that the operators are aware should the need for bus diversions arise. Also, depending on the type of road and the area, it may be appropriate to seek the views of agricultural and haulage interests.

It is recommended that the consultation process is not limited just to carrying out the statutory duties, but should open up a dialogue with all interested parties to ensure that as far as possible there is a consensus in favour of the scheme. At times it may be necessary for the highway authority to demonstrate their willingness to modify schemes in order to obtain an acceptable compromise. The Fire and Ambulance services will be concerned about response times; the advice in Traffic Advisory Leaflet 3/94 is still relevant.

Road Hump Dimensions

The only dimensions now constrained by the regulations are: maximum and minimum heights of 100mm and 25mm respectively; a minimum length of 900mm; and no vertical face to exceed 6mm in height.

It should be noted that the tolerances included in the 1990 Road Hump Regulations do not apply to the new regulations. So exceeding the 100mm height, without authorisation. So exceeding the 100mm height, without authorisation, would be likely to mean that Section 90E of Highways Act 1980 did not apply, with the result that the road hump could be viewed as an obstruction. (Humps constructed prior to the 1996 regulations will not be affected by this). Additionally it is not considered good practice to deliberately choose heights which are either higher or lower than those prescribed, on the grounds that the regulations would not then apply. This again would mean that Section 90E of the Highways Act would not apply with consequences for the highway authority in providing the device was not an obstruction.

Heights

It will be appropriate to vary the height of the hump, in accordance with: circumstances of the location (e.g. strategic route or residential); speed reduction required (mean "between hump" speeds of about 30mph, or 20mph); and the type of the road hump feature. Table 1 indicates general height dimensions for road types in accordance with approximate "between humps" mean speeds. Spacing between humps will also affect speed between humps: the lower the height the smaller the spacing to achieve suitable speed reductions. Ramp gradients may also influence mean "between hump" speeds. "Thumps" in excess of 50mm high may cause considerable discomfort to vehicle occupants and are not recommended.

Kerb to kerb flat top humps, of whatever type, cannot generally be laid to footway level without the kerbs being "dropped". Standard kerb heights between 125mm to 150mm high would exceed the prescribed 100mm height for road humps.

Table 1 – Appropriate Road Hump Heights for Approximate “Between Hump” Mean Speeds

| PRIVATE Road Hump Type | Mean “Between Hump” Speed (approximately) 30 mph | Mean “Between Hump” speed (approximately) 20 mph | Suggested maximum on/off ramp gradient |
|------------------------|--|---|--|
| Round Top | 50mm – 75mm ⁽¹⁾ | 75mm ⁽¹⁾ | N/A |
| Flat Top | 50mm – 75mm ⁽¹⁾ | 75mm ⁽¹⁾ | 1:10 |
| Raised Junction | 50mm – 100mm | 75mm – 100mm | 1:10 |
| Cushion | 60mm – 75mm | Without other measures may not be appropriate | 1:8 |
| “Thump” | 35 – 45mm. Up to 50mm heights have been used, but may cause unnecessary discomfort | Not really appropriate where low speeds are required. | N/A |

⁽¹⁾ Heights above 75mm are not generally recommended

Longitudinal profile

Hump profiles will generally be either curved, or flat top with ramps. Combinations of both curved and flat top road humps have been used but little design or performance information is available on them, so care should be taken if adopting such designs. The profile of curved ramps in the UK has generally been a segment of a circle. In other countries different shapes, such as sinusoidal curves have been used. The new regulations will allow such curves, but caution should be exercised as these may be difficult to form, and hence expensive. Information on the performance of sinusoidal humps, or similar is available based on research carried out abroad, however, this may not be entirely applicable to conditions in this country.

Transverse profile

The new regulations allow freedom for the designer to decide on the type of transverse profile adopted. However, it is recommended that generally the profile chosen follows previous advice. In the case of tapered humps, other than as described below, the channel should not be greater than 200mm in width and the width of the side ramps should be between 150mm to 300mm. It has been advocated that the width of the side ramp should be increased to allow an easier ride for cyclists. However, where there are cyclists present it would seem preferable to increase the channel width to create a cycle lane.

"Thumps" should normally finish within 200mm of the kerb to assist drainage. Where cyclists are likely to be present it may be an advantage to increase the gap, up to 750mm.

For speed cushions, the gap between the foot of the side ramp and the adjacent kerb should normally be not less than 750mm, to allow two wheeled vehicles (cycles and motorcycles) to avoid the cushions. This may be decreased if the nearside cushion (particularly in a three in line arrangement) is continually parked over, but in that event 500mm should be regarded as the minimum. The gap between adjacent cushions laid transversely in line, as measured between the foot of the respective ramps, should also normally be not less than 750mm. Smaller gaps have been used, but this may cause problems for two wheel vehicles, and makes it difficult for bus drivers in aligning their vehicles to straddle the cushions. Widths less than 500mm are not recommended, and should only be adopted in extreme situations. Maximum widths between cushions, or a cushion and a kerb, should not normally be greater than 1200mm, with 1000mm an ideal maximum. Widths greater than this will encourage drivers to aim for the gaps, which can cause concern to other drivers if it occurs in the centre of the carriageway, and to pedestrians if it is adjacent to the footway.

Ramp gradients

To limit the effects of vehicles grounding, it is recommended that the on/off gradients of road humps should not be steeper than those indicated in Table 1. Other considerations (see TA Leaflet 2/96) such as inclines, presence of buses etc. along a route, may demand shallower gradients. For speed cushions, the side gradients should not be steeper than 1:4 to avoid problems arising to cyclists and motorcyclists.

Spacing between humps

Except in the case of speed cushions, it is recommended that road humps should not be closer than 20m apart. But where, for instance, speed cushions are used to protect a pedestrian crossing, the spacing between them may be as little as 5m. With such an arrangement care should be taken to ensure that drivers can manoeuvre adequately through the feature. The maximum spacing between road humps will influence the mean "between hump" speeds (see TA Leaflet 2/96) and spacing in excess of 100m may increase the "between hump" speeds significantly. Spacing in excess of 150m, for any type of hump, is not recommended. For speed cushions and "thumps" spacing in excess of 100m is not recommended, and a maximum spacing of 70m would be appropriate.

Road Hump Lengths

The minimum length of 900mm referred to in the regulations will generally only be appropriate for "thumps". Other types of road humps should have minimum lengths as indicated in Table 2.

Table 2 – Recommended minimum and maximum lengths for road humps

| PRIVATE Road Hump Type | Minimum Length (m) | Maximum Length (m) | Comment |
|------------------------|----------------------|--------------------|---|
| Round Top | 3.7 | 3.7 | The performance of longer humps has not been researched. Speed reduction is likely to be lower. |
| Flat top | 2.5 (plateau length) | None | Along bus routes a minimum of 6m (plateau length) is preferred by bus operators. Plateaux greater than 20m are not generally recommended. |
| Raised Junction | None | None | It may be appropriate to extend raised area into side streets for a minimum length of 5m in front of give way markings to allow a car to wait on level surface. |
| Cushion | About 1.9 | 3.7 | It may be appropriate to have a minimum of 3m to prevent lengthways straddling by cars. |
| "Thump" | 0.9 | 1.5 | Little advantage in having lengths greater than 0.9m. |

Location

Under the 1996 regulations it will be possible to install road humps on trunk and principal roads, having speed limits not greater than 30mph, without special authorisation. However, regard needs to be given to the likely approach speeds, and the concerns of the emergency services. The 1996 regulations do not require a speed reducing feature to be located in advance of road humps, whether a single hump, or a series of them. It is strongly recommended that a speed reducing feature should be used to ensure that as far as possible the speed limit is not exceeded when the vehicle meets the first hump. Such features could include a junction immediately before encountering humps, or a bend of 70 degree or more, or give way markings at a pinch to create priority working. Conspicuous gateways can achieve, in their immediate location, quite high reductions in speed. Even so, they may not reduce speeds to 30mph and this will need to be borne in mind if gateways are to be used as speed reducing features.

Where a speed reducing feature is used, it should be less than 60m from the first hump to obtain the maximum benefit.

If a single road hump is used at an entry treatment on a side road, a speed reducing feature on the side road approaching the hump will normally not be necessary. However, authorities should ensure that when approaching the hump along the side road it is clear to the driver that there is a junction ahead. Road humps at entry points should normally be signed.

Where a gateway is considered to be appropriate as a speed reducing feature it may be preferable for the road hump to be located a short distance after it, say 10m to 20m away. This will ensure that drivers have sufficient opportunity to reduce their speed before encountering the hump, but denying them the opportunity to accelerate before reaching it.

Other than when used as an entry treatment, single road humps are not recommended, unless they can be used in conjunction with a speed reducing feature.

Where a side road leads into a road with road humps, it is recommended that a road hump should be met within a distance of at least 70m in order that drivers are not encouraged to increase their speed above 30mph. Where the side road carries through traffic, it is suggested that the first road hump should be met within 40m of the junction.

Road humps, other than in 20mph zones, are required to be placed at right angles to the centre line of the carriageway. This should not normally be a problem, but in the case where this cannot be achieved, other than in a 20mph zone, special authorisation will be required.

Pedestrian and Cycle Crossings

Road humps may be used at pedestrian and cycle crossing places. These include uncontrolled crossings, Pelican Crossings, Zebra Crossings, Toucan Crossings and Puffin Crossings. Where there are controlled areas, indicated by zig-zag lines, a road hump constructed at the crossing place may extend into that area. This will enable, for example, a 6m plateau length to be constructed to assist buses, though still maintaining a normal 2.5m to 3m crossing width. However, a road hump of whatever type must not be installed in a position where it is wholly contained within the area bounded by the zig-zag lines (controlled area).

Only flat top kerb to kerb road humps should be used at a crossing place.

It may be appropriate to locate speed cushions on each approach to an uncontrolled crossing, staggered in relation to that crossing. Some schemes have used cushions both on the entry and exist sides of a crossing. At one such site the result appeared to be a larger noise variation, which may have contributed to complaints about traffic noise. Advice on road humps and their effect on noise is contained in TA Leaflet 6/96. Speed cushions should not be placed on the crossing itself, as this could interfere with the safe passage of pedestrians.

Lighting

Other than in a 20mph zone, road humps should be lit by means of a system of road lighting, extending over the length of the road in which the road humps are installed. This must either consist of at least three lamps placed not more than 38m apart from each other, or comply with the requirements of BS 5489 (1992). It will be for the local highway authority to satisfy itself as to the appropriate standard of road lighting to be adopted, within the guidance provided by BS 5489. Where road lighting is not present, then lighting will need to be specially provided. In such cases the highway authority will need to ensure that the standard of lighting installed provides road users with sufficient illumination to be aware of the presence of the road humps at night. It is likely that such lighting would, as a minimum, provide for lighting columns to be installed on each approach to each road hump along the road.

Signing

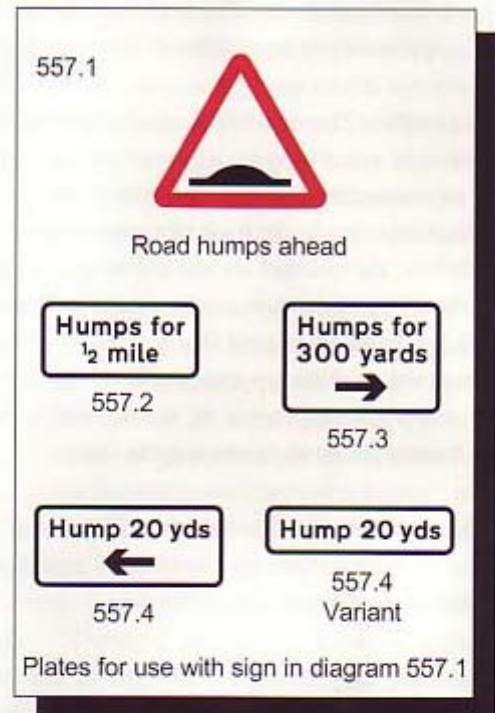
Signs (including markings) for road humps are contained in the Traffic Signs Regulations and General Directions 1994. The parts concerning the signing of road humps are being revised, and further will be issued when changes are made. Appropriate signs are illustrated in Figure 1. Signs to diagram 557.1 (road humps ahead) must be illuminated during the hours of darkness. It will be for the local highway authority to determine what signs will need to be erected to warn of the presence of road humps.

Figure 2 illustrates the type of signing that could be employed where road humps are used on adjacent roads within an area. Appropriate signs should be erected at all the entrances to the area. Relatively short "culs de sac" with not more than 100 dwellings, which adjoin the roads with road humps, but do not themselves have road humps, should not need signs erected on them to warn of road humps on the adjoining road.

Whether or not warning signs need to be erected on both sides of the carriageway will be determined by individual circumstances. Where a gateway is to be used as speed reducing feature it is recommended that signs are erected on both sides of the carriageway, and incorporated into the gateway. Where several adjoining roads have road humps, the distances on the sign plates to Diagrams 557.2 and 557.3 need to be assessed. They should be based on the distance over which the road humps extend along the road where the sign is erected, or immediately relates to. Separate signing for adjoining roads should not be necessary, providing the first hump in the adjoining road is within 40m of the junction of the two roads. Similarly, traffic from the side road should not need to be warned of road humps on the main road if road humps are within 40m of the side road junction.

Where road humps are installed only on one road, signing will be similar to Figure 2: signs will need to be erected on each entrance to the road, other than at short cul-de-sac's. If the road humps are spaced more than 150m apart, each individual hump should be signed.

Figure 1 (Not to Scale)



Refer to the Traffic Signs Regulations and General Directions 1994 for appropriate dimensions

Figure 2 (Not to Scale)

Note for Figure 2

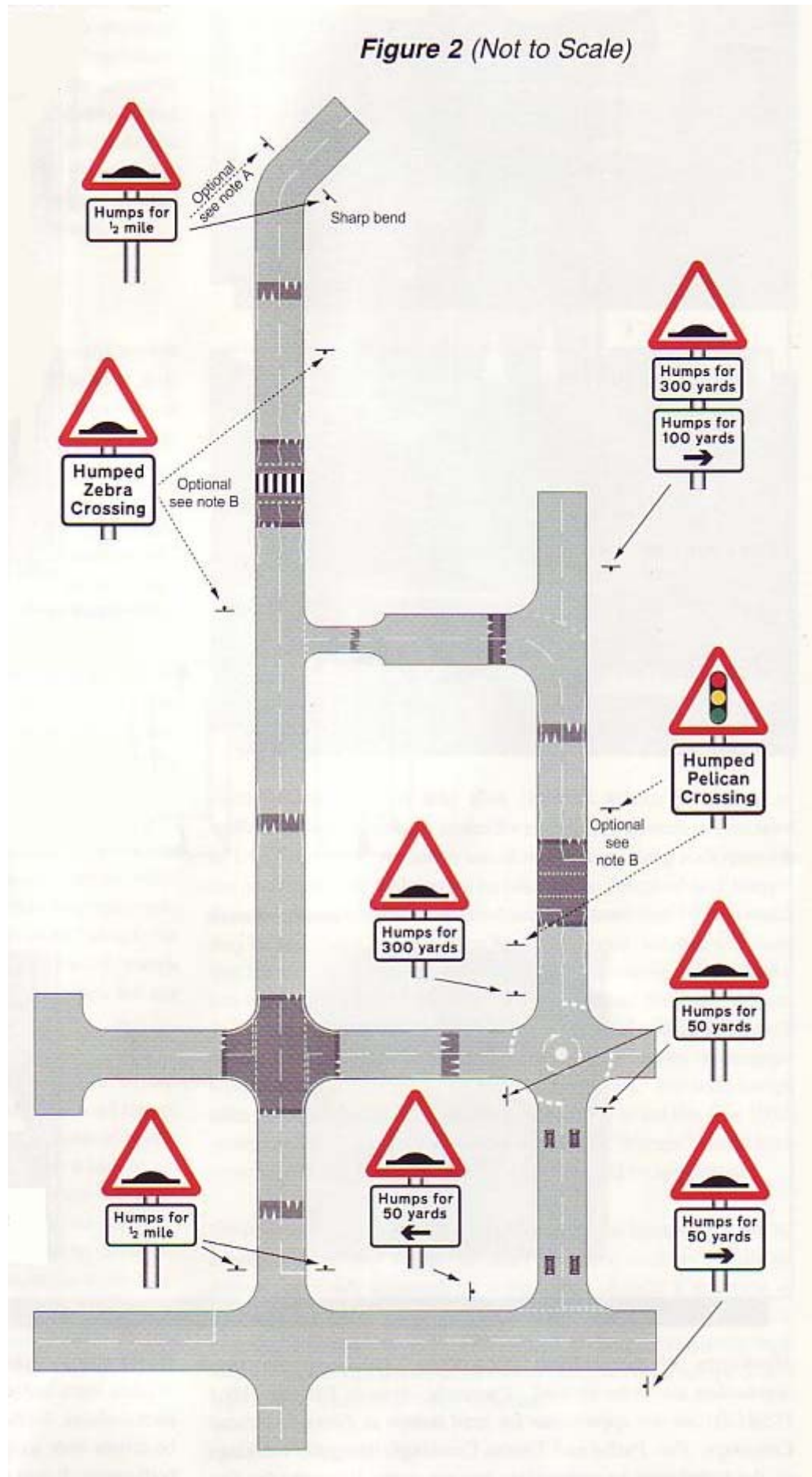
A - Signs on both sides of the carriageway may be appropriate where it is considered that emphasis needs to be given to the presence of road humps ahead.

B - Signing of humped and Zebra and Pelican Crossing signs will generally only be necessary if spacing between the adjacent humps is greater than 100m.

C - Distance plates should indicate the distance that the series of road humps extends along the road to which the sign immediately applies.

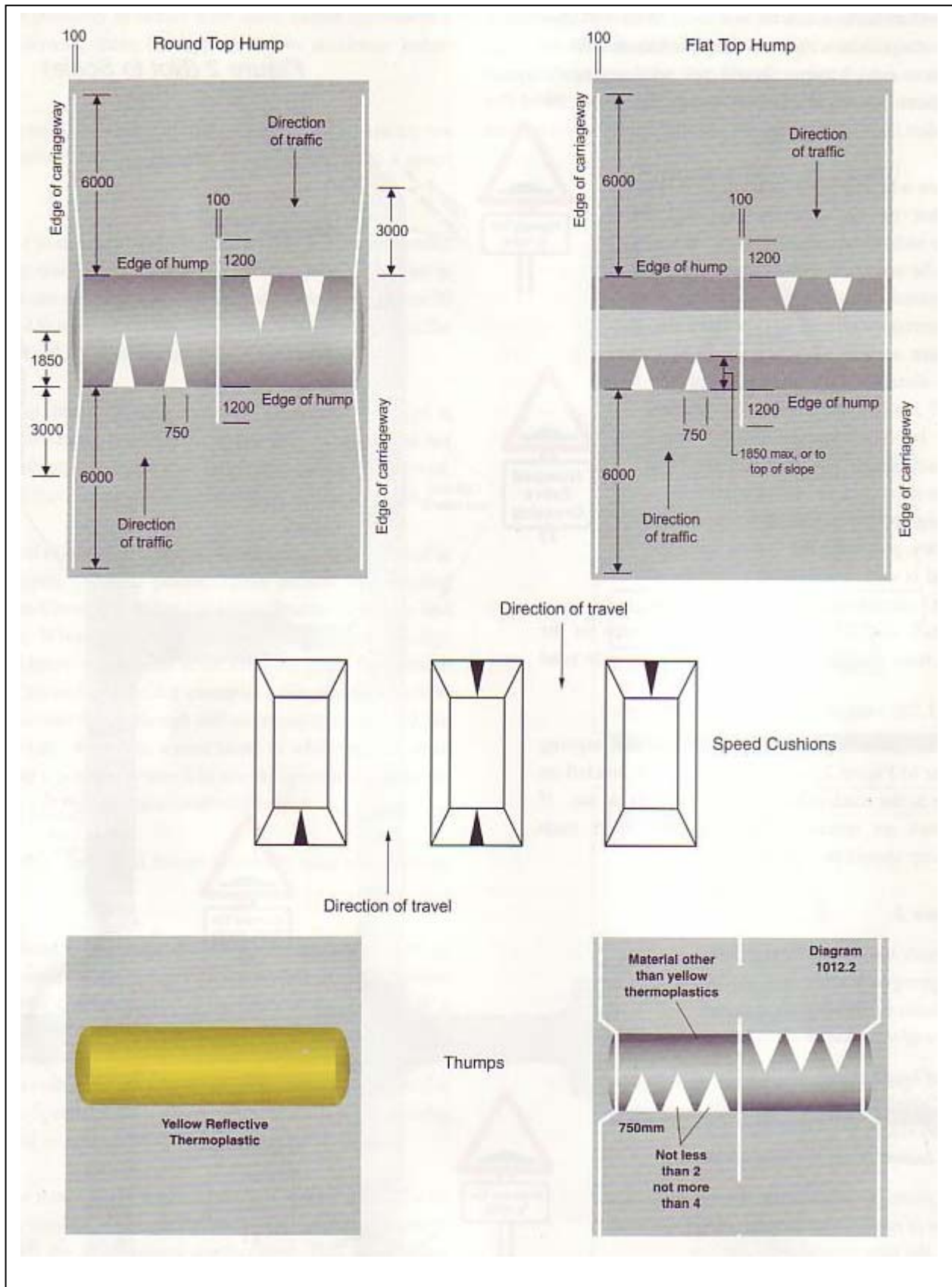
D - Side roads with road humps do not need to be separately signed, provided the first hump in the side road is within 40m of the junction. Similarly, these same side roads do not have to warn of road humps on the main road if the humps on the main road are within 40m.

E - Cul-de-sac leading to a road having road humps do not need signs to warn of humps if the cul-de-sac only serves around 100 dwellings.



Road markings for road humps

Figure 3 illustrates the type of markings suitable for road humps.



Markings at pedestrian crossings

Pedestrian crossings regulations are to be revised. Currently, signs to Diagram 1061 (TSRGD) are not appropriate for road humps at Zebra or Pelican Crossings. For Puffin and Toucan Crossings, triangular markings on the ramps may be appropriate, but not centre line nor edge line markings. At uncontrolled crossing places, markings in accordance with Diagram 1061 (TSRGD) should be used.

Markings for Speed Cushions

A single triangle, which currently requires signs authorisation, should be used on the approach ramp of each cushion. In the case where vehicles from both directions might be driven over a cushion the triangular marking should be used on both ramps. It is not appropriate to use any edge line marking across the top of the cushion as a warning of the side ramps. Where there are centrally positioned cushions which may be traversed by vehicles in both directions, hatched markings to Diagram 1040 (TSRGD) could be used on both approaches to the cushion.

Markings for "Thumps"

Where a thump is constructed from yellow reflective thermoplastic material no markings are necessary. Where other material is used, then unless it can be constructed in a suitable alternative yellow reflective material, it should not be coloured yellow but should incorporate the markings shown in Figure 3, which at present require signs authorisation. Triangular markings should extend from the base to the centre of the thump. The number of markings to be used will be determined by the particular circumstances. There should not be less than two on a side, nor more than four. Having a total of four triangles per side would be the norm, and in the case of a one way road they should be applied across the full width of the carriageway.

20mph Zones

Road hump markings and warning signs are not required within 20mph zones. Markings may be used if it is considered appropriate, particularly to enhance the conspicuity of the road humps. It should not be necessary to use warning signs, as the zone signs will be sufficient.

It will not be necessary to seek special authorisation if road humps are not formed at right angles to the centre line of the carriageway within a 20mph zone. However, this is generally not advised other than in the case of speed cushions within a chicane or pinch point.

Two wheeled vehicles

Both flat top and round top roads humps should be able to be negotiated by both cyclist and motorcyclists quite safely, though some users may experience discomfort. It has been suggested that sinusoidal curved humps may be more comfortable for cyclists, but experience of these designs in the UK is limited.

In the case of speed cushions, both motorcyclist and cyclists can use the adjacent gaps, which should be at least 750mm wide. Where two wheeled vehicles may be forced to ride over cushions, e.g. because of the presence of parked vehicles, it should be safe for them to do so. However, since riders may encounter the side ramps in such circumstances, it is important that the side ramps are not steeper than 1:4.

In some cases it might be helpful to provide a cycle land bypass between the kerb and the taper of a flat or round top road hump. Where possible this should be in the form of a mandatory cycle lane, so that other vehicles do not enter the area. The width of the cycle lane at these locations should not be greater than 1000mm, and not less than 750mm. If an island is used to separate the cycle land from the road hump, the width of the lane should be increased to 1.5m. Where it is not feasible to

provide a mandatory cycle lane, the cycle land bypass should be marked out in the form of an advisory cycle lane. The surface of the cycle lane needs to be one that is suitable for cyclists, and gullies should not be located within the area between road hump and kerb.

Emergency service and bus routes

Advice on the use of traffic calming on strategic routes for emergency services is contained in TA Leaflet 3/94. Although use of road humps along such routes is not precluded, care will need to be taken in the design of such humps. In some cases the use of speed cushions no greater than 1.7m in width may be acceptable. Similarly, on bus routes speed cushions will cause less discomfort to passengers. Where raised junctions are installed it can be an advantage to use shallower gradients of between 1:15 and 1:20. Experience of ramp gradients used by local authorities in such locations is reported in TA Leaflet 2/96. Road humps on strategic routes should not normally be higher than 75mm. For roads humps other than speed cushions and "thumps", spacing of not less than 100m apart may be preferable. As speed cushions and "thumps" should have minimal effect, spacing not greater than 70m will be appropriate.

Structures

Other than in 20mph zones, road humps must not be constructed on any bridge or other structure such as a subway, culvert, or inside a tunnel, or within 25m of such a structure or tunnel. This is to ensure structure damage does not arise as a result of vehicle impact, or increased impact loading. Within 20mph zones it would still not be advisable to construct road humps of any type within a tunnel or other structure.

Railways

The regulations prescribe a minimum distance of 20m between any part of a road hump and a level crossing. Away from a level crossing a road hump must not be closer than 2m to any rails (this will include light rail tracks). The rail operator should always be consulted about the siting of any humps near to level crossings or light rail tracks.

Enquiries

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References

Highway Act 1980

Highways (Road Humps) Regulations 1996 (SI 1996/1483)

Highways (Traffic Calming) Regulations 1992 (SI 1993/1849)

Highways (Road Humps) Regulations 1990 (SI 1990/703, 1990/1500)

The Traffic Signs Regulations and General Directions 1994 (SI 1994/1519)

TA Leaflet 2/90 Speed Control Humps (Superseded by TA 7/96)

TA Leaflet 3/91 Speed Control Humps, Scotland, England and Wales

TA Leaflet 11/93 Rumble Devices

TA Leaflet 13/93 Gateways

TA Leaflet 2/94 Entry Treatments

TA Leaflet 3/94 Emergency Services & Traffic Calming: A Code of Practice

TA Leaflet 4/94 Speed Cushions

TA Leaflet 7/94 "Thumps" - Thermoplastic Road Humps

TA Leaflet 7/95 Traffic Islands for Speed Control

TA Leaflet 2/96 75mm High Road Humps

TA Leaflet 4/96 Traffic Management and Emissions

TA Leaflet 6/96 Traffic Calming: Traffic and Vehicle Noise

TRL Report 18 - Road Humps for controlling vehicle speeds

TRL Report 32 - Speed control humps - a trial at TRL

TRL Report 103 - Vehicle and traffic noise alongside speed control cushion in York

TRL Report 174 - The environmental assessment of traffic management schemes: A literature review

TRL Report 180 - Traffic calming - Vehicle noise emissions alongside speed control cushions and road humps

TRL Report 182 - Traffic calming - Four schemes on distributor roads

TRL Report 186 - Traffic calming - Road hump schemes using 75mm high humps

British Standards BS 5489:1992, Road Lighting

Information on sinusoidal humps

TRL Paper PA2046/91 - Translation of Dutch 30 km/h zone Design Manual,
Danish Roads Directorate - Urban Traffic Areas, Part 7, Speed Reducers

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