A trench cover with a main support region, the main support region may include a flexible moulded plastic base 12 and a rigid moulded plastic upper part 14, where the base and upper part may be secured to one another, and a flexible sloped or inclined wedge region 28 adjacent an edge of the support region. The sloped region 28 may have a channel or groove 54 to assist in the flexing thereof. The base may have projecting parts which extend beyond the upper part, or the base may extend up to the edge of the upper part.
Trench Cover

This invention relates to a trench cover, for example intended for use in covering trenches, holes, cavities of other excavations formed in a surface. The invention may be used in areas in which the load that must be borne by the trench cover is relatively low, such as covering trenches formed in footpaths or pavements. However, it will be appreciated that this need not always be the case and the invention could be applied to other applications, for example applications in which vehicles must be supported, and some of the described arrangements are intended for such use.

Where a trench is dug in a footpath or pavement, for example to allow the installation or maintenance of cables, pipes or the like below the footpath or pavement, it is often necessary to leave the trench open for a period of time. Although in some circumstances, the trench may be left open with barriers or the like located around the trench to provide a visual indication of the presence of the trench and a guard against passers by inadvertently falling into the trench, it is often preferred to locate a cover over the trench. The use of such a cover has the advantage that obstruction of the pavement or footpath is minimised, and can also serve to provide limited protection against rain or the like to the pipes or cables located within the trench. Similar circumstances apply to trenches formed in road surfaces.

A number of designs of trench cover are known. In its simplest form, it is known to simply locate a sheet of steel or the like over the trench. However, such a cover is usually very heavy. It is also known to use plastics material moulded covers to extend over such trenches. Such covers tend to be of relatively thick form, for example 35 – 40mm thick, in order to provide the required level of load bearing strength. As a result they, too, tend to be relatively heavy and also form a trip hazard. In order to reduce the trip hazard, it is known to form tapering, sloped regions around the periphery of the cover. However, where two or more such covers are located adjacent one another, the V-shaped recesses in the temporary surface formed by the adjacent covered sloped regions themselves form trip hazards. Also, the materials used are rigid in order to provide the required level of strength and, as a result, will tend to be damaged on impact, such as if dropped, and have a tendency to slide across the surface on which they are used, and so may become incorrectly positioned. Such incorrect positioning may lead to the cover becoming unstable or in parts of the trench no longer being
covered. Where the ground surface is not flat, such covers may wobble, in use, rather than remain stationary, and this lack of stability is undesirable.

It is an object of the invention to provide a trench cover in which the disadvantages set out hereinbefore are overcome or are of reduced effect.

According to one aspect of the invention there is provided a trench cover comprising a main support region and at least one sloped region adjacent an edge of the main support region, wherein the sloped region is of flexible form.

It will be appreciated that flexing of the sloped region can accommodate the positioning of covers in an overlapping manner, accommodate variations in the underlying ground surface, and reduce the risk of damage in the event of being dropped.

In one arrangement the trench cover comprises a base of moulded plastics form, the material of the base being of flexible form, and an upper part of moulded plastics form, the material of the upper part being of relatively rigid form, the base and upper part being secured to one another.

Such an arrangement is advantageous in that the base, which is of relatively flexible form, can absorb impacts with less risk of damage, whilst the upper part is still of sufficient strength to bear the required loadings. Further, being of flexible form, the base can take up slight variations in surface beneath the trench cover, thereby enhancing the stability of the trench cover, and is more likely to grip the underlying surface, and hence is less likely to move, in use.

The base is preferably of larger dimensions than the upper part, and the projecting parts of the base are preferably of sloping or tapering form. The formation of sloping regions reduces the trip hazard presented by the trench cover. By forming the sloping regions in the base, the sloping regions can be of flexible form and thus can deform. If the adjacent sloping regions of two adjacent trench covers are located on top of one another, they can deform to form a substantially flat area.
The upper part is preferably provided with a non-slip surface and/or can be manufactured from a high visibility material. If desired, one or more logos can be incorporated therein.

The upper part may be provided with openings through which parts of the base project. The base may define a groove into which edge parts of the upper part are fitted. The base and upper part may be manufactured separately and subsequently secured to one another. Alternatively, the upper part maybe moulded in a first moulding operation, and the base subsequently moulded around the upper part, securing the upper part to the base.

The base may be made from a recycled material. It may be continuous, extending across the underside of the entire upper part, or may extend just adjacent the periphery thereof, if desired.

It is envisaged that the trench cover will be of thickness approximately 18mm.

In an alternative arrangement, the sloped region may comprise a separate component adapted to be secured to an edge part of the main support region. It may include a channel to assist in flexing of at least part thereof. It may be designed to be bolted to the main support region.

The invention will further be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a view illustrating a trench cover in accordance with one embodiment of the invention;

Figure 2 is an exploded view.

Figure 3 is a view illustrating part of the trench cover to an enlarged scale;

Figure 4 illustrates two trench covers located adjacent one another; and

Figures 5 to 9 illustrate a second embodiment.
Referring to Figures 1 to 4 of the accompanying drawings, a trench cover 10 is illustrated which comprises a base 12 and an upper part 14. The base 12, in the arrangement illustrated, is of generally square shape, having rounded corners, and includes an upper surface 16 on which are integrally formed a series of upstanding, generally cylindrical projections 18. As best shown in Figure 3, around the periphery of the upper surface 16 is formed a lip 20 defining, with the upper surface 16, a groove 22.

The upper part 14 is of generally square shape, or dimensions similar to those of the upper surface 16, the upper part 14 being formed with openings 24 shaped and positioned to receive respective ones of the projections 18. A reduced thickness part 26 of the periphery of the upper part 14 is received within the groove 22. It will be appreciated that the location of the projections 18 within the openings 24, and the part 26 within the grooves 22 provides a mechanical lock between the upper part 14 and the base 12, firmly securing these components to one another. If desired, an adhesive may be located therebetween, either in addition to or instead of the mechanical lock so formed.

The upper surface of the upper part 14 may be provided with a non-slip texture, if desired. Further, logos or other information may be moulded therein, and the colour of the upper part 14 may be selected to be of high visibility and/or to match corporate colours, etc., if desired.

The upper part 14 is moulded from plastics material of high strength, typically a virgin plastics material, so as to be able to bear the majority of loads applied to the trench cover, in use. The upper part 14 thus forms the main support region of the trench cover.

Around the periphery of the base 12 are formed tapering or sloping regions 28. The provision of such regions 28 reduces the formation of a trip hazard, in use. In addition, as shown in Figure 3, the underside of the base 12 may be formed with a series of ribs 30 in which, in use, serve as feet, supporting the trench cover.

The base 12 is moulded from a relatively flexible plastics material, and may incorporate quantities of recycled material if desired. The formation of the base 12
from a relatively flexible material allows the base 12 to deform to accommodate small variations in the surface upon which the trench cover is located, in use, for example by localised deformation or compression of the ribs 30. The material is preferably sufficiently resilient that the ribs return to substantially their original shape after use rather than remaining permanently deformed. It may further enhance the grip between the trench cover and the surface upon which it is used, thereby reducing movement of the trench cover, in use. Further, the nature of the material of the base 12 enhances the ability of the trench cover to withstand impacts without damage thereto, thereby increasing the useful working life of the trench cover.

As shown in Figure 4, in use, when a relatively long trench is to be covered, two or more such trench covers may be provided adjacent or side-by-side one another. The trench covers are positioned such that the adjacent sloping regions 28 overlie one another, the upper one of the overlapping regions 28 deforming to accommodate the location of the other, lower one of the regions 28. It will be appreciated that the arrangement of the trench covers in this manner substantially avoids the formation of a V-shaped recess where adjacent covers abut one another. As the formation of such an uneven walkway is avoided, it will be appreciated that the risk of tripping is further reduced.

As mentioned hereinbefore, such an arrangement is advantageous in that the risk of damage to the trench cover can be reduced, slipping can be reduced, the stability of the trench cover can be enhanced by accommodating variations in the surface upon which the trench cover is positioned, and the formation of trip hazards can be reduced. It is envisaged that the trench cover will have an overall height or thickness of approximately 18mm which is significantly smaller than with known plastics moulded trench covers. As the base 12 can be manufactured using, for example, recycled materials, it can be designed to have sufficient weight to ensure that the trench cover remains in position and is unlikely to be moved or tampered with by passing pedestrians or vehicles, without significantly increasing the cost of the product.

Although in the arrangement described above the base 12 extends under the entire upper part 14, this need not always be the case and arrangements are possible in which the base 12 extends, for example, adjacent just the periphery of the upper part 14. Further, although the sloping regions 28 are illustrated as being of substantially
uniform wall thickness, arrangements in which they are of tapering form are possible. If desired, the sloping regions 28 may extend, at rest, beneath the level of the remainder of the base 12 so as to ensure that, in use, they contact the ground around substantially the entire perimeter of the cover, other than where used in conjunction with one or more other covers to cover a large trench.

Although the arrangement described hereinbefore may be manufactured by separately moulding the two components and subsequently securing them to one another, it is envisaged that the trench cover could be manufactured by moulding the upper part 14, placing it into a mould, for example an open mould, and moulding the base 12 around and onto the upper part 14.

Figures 5 to 9 illustrate a second embodiment incorporating many of the variants mentioned above. The arrangement of Figures 5 to 9 comprises a main support region 40 of moulded plastics form which, in use, is intended to be positioned over a trench to be covered, opposite ends of the region 40 sitting upon the ground surface adjacent opposite sides of the trench. The region 40 is provided, on its underside, with a series of strengthening ribs 42 to enhance the load bearing capacity of the trench cover. For example, it may be able to withstand the passage of certain vehicles.

Adjacent opposite edges 44 of the region 40, tapering sloped components 46 are provided. The components 46 are identical to one another, and each comprises a fixing part 48 intended to be fitted to the underside of the region 40, channels 50 being provided to accommodate some of the ribs 42. Conveniently, the components 46 are bolted to the region 40, for example through steel plates or the like received within recesses formed in the components 46. However, other fixing techniques may be used. Integral formed with the part 48 is a tapering, ramped or sloped part 52, a channel 54 extending across the underside of the part 52 to assist in flexing thereof. The component 46 is of flexible moulded plastics form.

As best shown in Figure 7, the lower surface of the part 52 extends below the plane of the lower surface of the region 40 so that good contact between the part 52 and the ground surface is achieved in use.
As with the arrangement of Figure 1 to 4, flexing of the part 52 assists in avoiding or reducing the formation of trip hazards, and reduces damage, slipping, etc. As illustrated, regions 46 are only provided adjacent two opposing edges, thereby permitting two or more such covers to be butted up against one another if desired. However, this need not always be the case.

It will be appreciated that a wide range of modifications and alterations may be made to the arrangement described hereinbefore without departing from the scope of the invention. For example, although trench covers of generally square shape are described, rectangular or other shaped trench covers may be provided.
CLAIMS

1. A trench cover comprising a main support region, and at least one sloped region adjacent an edge of the main support region, wherein the sloped region is of a flexible form.

2. A trench cover according to Claim 1, wherein the sloped region is provided with a channel to assist in flexing thereof.

3. A trench cover according to Claim 1, comprising a base of moulded plastics form, the material of the base being of flexible form, and an upper part of moulded plastics form, the material of the upper part being of relatively rigid form, the base and upper part being secured to one another, the base defining the sloped region.

4. A trench cover according to Claim 3, wherein the base is of larger dimensions than the upper part.

5. A trench cover according to Claim 3 or Claim 4, wherein the base includes projecting parts, projecting beyond the upper part forming the sloped region.

6. A trench cover according to any of Claims 3 to 5, wherein the upper part is provided with a non-slip surface and/or can be manufactured from a high visibility material.

7. A trench cover according to any of Claims 3 to 6, wherein the upper part is provided with openings through which parts of the base project.

8. A trench cover according to any of Claims 3 to 7, wherein the base defines a groove into which edge parts of the upper part are fitted.

9. A trench cover according to any of Claims 3 to 8, wherein the base and upper part are manufactured separately and subsequently secured to one another.
10. A trench cover according to any of Claims 3 to 8, wherein the upper part is moulded in a first moulding operation, and the base subsequently moulded around the upper part, securing the upper part to the base.

11. A trench cover according to any of Claims 3 to 10, wherein the base is made from a recycled material.

12. A trench cover according to any of Claims 3 to 6, wherein the base is continuous, extending across the underside of the entire upper part.

13. A trench cover according to any of Claims 3 to 11, wherein the base extends just adjacent an edge or the edges of the upper part.

14. A trench cover according to any of the preceding claims, and of thickness approximately 18mm.

15. A trench cover substantially as hereinbefore described with reference to the accompanying drawings.
Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

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<td>X:1, 3-14, Y:2</td>
<td>JP08246407 A (YASUDA) See figures and abstract translation</td>
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<td>US2002/184718 A1 (ARMFIELD) See especially figure 8</td>
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<td>US6422784 B1 (PELLEGRINO) See figures, column 4 lines 40-41</td>
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<td>X</td>
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<td>GB2282622 A (VOCKINS) See figures, especially channel 9 to assist flexing of sloped region</td>
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<td>Y</td>
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<td>JP01021101 A (MIURA) See figures and abstract translation for flexible sloping ground cover with a channel 4 to assist flexing</td>
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Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X:

Worldwide search of patent documents classified in the following areas of the IPC

E01C; E02D

The following online and other databases have been used in the preparation of this search report

Epodoc & WPI
### International Classification:

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