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(54) Surface access cover

(57) A surface access cover (10) comprises a cover body (12). The cover body (12) has a primer layer (13) secured on a surface thereof. The primer layer (13) has secured thereto a resin layer (14) that defines an in-use engageable surface of the access cover (10). The resin layer (14) has embedded therein at least adjacent the said engageable surface a plurality of aggregate particles (15). At least some of the aggregate particles (15) give rise to undulations in the engageable surface. The primer layer (13) serves to bond the resin layer (14) to the cover body (12).

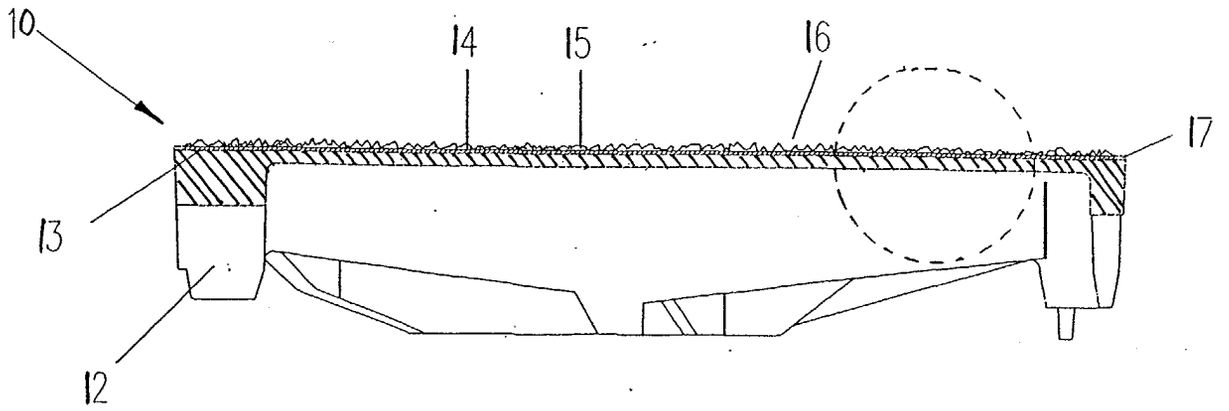

Figure 1

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Description

[0001] This invention relates to a surface access cover; a method of making the same; and a surface access assembly including such a cover.

[0002] Surface access covers are commonly used to cover access apertures (such as but not limited to manholes) for e.g. sewer, water, electrical, gas or telecommunications systems. They are usually located in roadway, pavement, yard or garage surfaces although their use is not limited to these areas.

[0003] Typically in order to support such covers a frame having a peripheral flange is secured in a medium of aggregate and cement. The flange is embedded in the cement and aggregate mix (or another bonding medium).

[0004] The frame defines an upstanding wall the uppermost extent of which is, in use, flush with the adjacent roadway etc. surface. Consequently the frame defines an aperture within the surface.

[0005] The upstanding wall includes supports for one or more surface access covers that are removably insertable therein so as to close the aperture. The covers are usually shaped to minimise the risk that they will fall into the aperture on removal.

[0006] The covers themselves usually are cast iron; or they are fabricated or otherwise formed from steel. Cast iron covers constitute the overwhelming majority of covers installed in the United Kingdom.

[0007] Cast iron access covers have been highly successful for numerous reasons: they are robust, hard wearing, weatherproof and cheap to manufacture, transport, install and replace. The mass of a cast iron access cover assists in firmly seating the cover in the frame.

[0008] Despite the foregoing advantages of cast iron covers, one potential disadvantage of all cover types relates to the potential slipperiness of their exposed (herein "engageable") surfaces. This can lead to accidents.

[0009] In the case of access covers installed in pavement surfaces the skid resistance of the cover differs from that of the surrounding pavement. A pedestrian walking from the pavement material onto the access cover may find it difficult to accommodate the resulting unexpected change in the coefficient of friction and may slip.

[0010] This problem of coefficient of friction differences also arises in access covers that are traversed by vehicles, e.g. in roadways. In such installations the problem is exacerbated as vehicular traffic wears the engaging surface of the access cover and polishes it to a shiny, slippery condition.

[0011] Motorcycles and bicycles are particularly vulnerable to such slippery surfaces, especially when the roadway is wet, muddy or coated with leaves.

[0012] There is therefore a need for surface access covers that exhibit a greater degree of skid resistance.

[0013] WO 02/094540 proposes a skid resistant surface of an iron access cover. The skid resistant surface comprises a layer of fibre reinforcement and a layer of mineral material. The two layers are bound together by a resin matrix.

[0014] A disadvantage of this arrangement is that the resin matrix tends in use to part from the metal surface.

[0015] A further disadvantage is that the mineral material is substantially entirely embedded within the resin matrix. Consequently the skid resistance achieved is poor.

[0016] According to a first aspect of the invention there is provided a surface access cover comprising a cover body having secured on a surface thereof a primer layer, the primer layer having secured thereto a resin layer that defines an in-use engageable surface of the access cover, the resin layer having embedded therein at least adjacent the said engageable surface a plurality of aggregate particles at least some of which give rise to undulations in the engageable surface; and the primer serving to bond the resin layer to the cover body.

[0017] An advantage of this arrangement is that the primer layer ensures a strong bond between the resin and the cover body. The undulatory nature of the engageable surface provides a desired degree of skid resistance.

[0018] Preferably at least some of the aggregate particles protrude beyond the resin. An advantage of this arrangement is that a very good skid resistance is achievable.

[0019] Preferably the surface of the cover body adjacent the primer layer is substantially free of embossments and recesses. This is a departure from the tradition of providing embossments, that are commonly called "chequers", on the surface of an iron or steel access cover for the reasons of improving skid resistance and water drainage. Omitting the embossments and recesses advantageously reduces the amount of metal in the cover body.

[0020] In preferred embodiments of the invention the surface access cover has a skid resistance value (SRV) (that is measured using an established testing technique) in the range 55 to 60.

[0021] A pavement surface typically has a SRV in the range 45 to 55. A roadway or vehicle yard surface might typically have a SRV in the range 55 to 60. The approximate matching of the SRV of the surface access cover with the SRV of the surrounding surface provides for a desired degree of skid resistance. This is particularly important in pavement installations where too high a degree of skid resistance could constitute a trip hazard.

[0022] Preferably the cover body includes a wall upstanding therefrom, the wall substantially defining the perimeter of the resin layer.

[0023] During curing the wall retains the resin layer on the access cover. Depending on the precise access cover design, the wall can also prevent ingress of uncured resin into keyways and similar such features of the access cover, during manufacture of the cover.

[0024] In preferred embodiments of the invention the primer layer is or includes a solvent-based rust-inhibiting primer.

[0025] A solvent-based rust-inhibiting primer is particularly good at providing a strong bond between the resin layer and the cover body, with the result that the resin layer and the aggregate particles embedded therein remain secured to the cover body during arduous wear conditions.

[0026] Preferably the resin layer is or includes a methyl methyacrylate.

[0027] Methyl methyacrylate compounds are readily available, cheap and easy to use.

[0028] In a practical embodiment of the invention the aggregate particles range in size from 0.5mm to 2.0mm when measured in their longest dimension.

[0029] Conveniently the aggregate particles are or include so-called 'Criggion', a speckled white and green albitised dolerite.

[0030] Preferably the aggregate particles are or include bauxite.

[0031] In a further arrangement it is possible to use aggregate particles that are or include foundry slag.

[0032] Mixtures of Criggion, bauxite and foundry slag are possible within the scope of the invention.

[0033] Numerous other aggregate materials are useable within the scope of the invention.

[0034] The preferred aggregate materials provide a skid resistant surface even when exposed to a variety of weather conditions and surface contaminants.

[0035] In addition, the use of foundry slag advantageously allows the recycling of a waste material formed as a by-product of the manufacture of iron surface access covers. The operator of a foundry otherwise would normally bury such material in landfill sites.

[0036] In one preferred embodiment of the invention at least part the resin layer includes one or more dyes or pigments whereby the said part of the resin layer emits or reflects incident light in a predetermined range of wavelengths.

[0037] In another preferred embodiment of the invention at least some of the aggregate particles include one or more dyes or pigments so as to emit or reflect incident light in a predetermined range of wavelengths.

[0038] Conveniently the range of wavelengths of light emitted or reflected by the resin layer is generally the same as the range of wavelengths emitted or reflected by the aggregate particles.

[0039] These two features allow the surface access cover to match the colour of the surrounding roadway, pavement or other surface. Furthermore, they provide the opportunity visibly to tag the access covers. Additionally they provide for utility-specific (e.g. water, electricity or telecommunications) identification of surface access covers.

[0040] Alternatively the range of wavelengths of light emitted or reflected by the resin layer differs from the range of wavelengths emitted or reflected by the aggregate particles to an optically detectable extent. This provides for the creation of unusual surface finishes on the in-use engageable surface of the access cover.

[0041] In a further embodiment of the invention the resin layer includes a plurality of dyes or pigments whereby different areas of the resin layer emit or reflect incident light in different predetermined ranges of wavelengths.

[0042] Preferably respective groups of the aggregate particles include differing dyes or pigments whereby the respective groups emit or reflect different predetermined ranges of wavelengths of incident light.

[0043] The foregoing features provide for the creation of e.g. patterns, advertising logos or artwork in the in-use engageable surface of the access cover.

[0044] According to a second aspect of the invention there is provided a method of making a surface access cover comprising the steps of:

a) scavenging contaminants from a surface of a cover body;
b) applying a primer layer to at least part of the scavenged surface;
c) coating at least part of the primer layer with a mix of a curable resin and aggregate particles to define an in-use engageable surface; and
d) allowing the resin to cure with at least some aggregate particles giving rise to undulations in the engageable surface.

[0045] Preferably step (c) includes applying a curable resin layer to the primer layer and, before curing thereof, casting a plurality of aggregate particles into the resin layer.

[0046] Alternatively step (c) includes mixing at least some aggregate particles into a curable resin before applying the mixture to the primer layer.

[0047] Thus all the steps of the method of the invention conveniently may be carried out at a single site.

[0048] In addition the step of applying a primer layer to a surface of the body prevents subsequent contamination of the surface of the cover body and so negates the requirement to apply a mix of resin and aggregate particles immediately.

[0049] Preferably the method includes the step of, before step (d), applying a force to the mix of resin and aggregate particles adjacent to the primer layer.

[0050] This feature provides for a comparatively low SRV that is suited to pavement installations.

[0051] In addition the application of a force ensures that the mix of resin and aggregate particles adjacent to the primer layer is evenly distributed.

[0052] In another version of the method of the invention the aggregate particles are cast into the resin layer until the resin layer is saturated with aggregate particles at least adjacent the surface thereof via which the aggregate particles are cast. This results in a large number of aggregate particles protruding beyond the resin and

so provides for a higher SRV that is suited to roadway installations.

[0053] Preferably the method includes the step of removing any excess aggregate particles after step (d). This allows any unused aggregate particles to be recycled.

[0054] In a practical embodiment of the method of the invention the thickness of the resin layer is at least 0.6mm. This ensures that the resin cures completely.

[0055] Preferably the resin layer is applied by hand.

[0056] Preferably the resin and aggregate particle mixture is applied by hand.

[0057] In another embodiment of the method the resin layer is applied by a so-called "airless spray" technique, ie. a spray technique using a piston pump operating at a pressure of eg. 13.8Mpa (2000psi).

[0058] In a still further embodiment of the method the resin and aggregate particle mixture is applied by airless spray.

[0059] The foregoing features provide manufacturing flexibility. The use of an airless spray method offers the possibility of using a partially or fully automated process.

[0060] Preferably the primer is or includes a solvent-based rust-inhibiting primer.

[0061] Preferably the resin layer is or includes a methyl methyacrylate.

[0062] In a practical embodiment of the method of the invention the aggregate particles range in size from 0.5mm to 2.0mm when measured in their longest dimension.

[0063] Conveniently the aggregate particles are or include Criggion.

[0064] In another embodiment of the method it is possible to use aggregate particles that are or include bauxite.

[0065] In a further embodiment of the method it is possible to use aggregate particles that are or include foundry slag.

[0066] The use of a mixture of Criggion, bauxite and foundry slag is possible within the scope of the method of the invention.

[0067] Other aggregates, such as those referred to herein, are also useable within the scope of the invention.

[0068] Preferably the method includes the step of, before step (c), adding one or more dyes or pigments to the resin.

[0069] Additionally or alternatively the method includes the step of, before step (c), adding one or more dyes or pigments to at least some of the aggregate particles.

[0070] Preferably the method includes, before step (c), one or more of the following steps:

(e) adding similar dyes or pigments to both the resin and at least some of the aggregate particles;

(f) adding differing dyes or pigments respectively to the resin and at least some of the aggregate particles;

(g) adding differing dyes or pigments to respective regions of the resin; or

(h) adding differing dyes or pigments to respective groups of the aggregate particles.

[0071] Preferably the method step (c) includes the use of at least one template to form patterns, advertising logos or artwork in the mix of resin and aggregate particles adjacent to the primer layer.

[0072] Thus the method of the invention provides advantages analogous to those inuring to the access cover of the invention, as described herein.

[0073] According to a third aspect of the invention there is provided a surface access assembly comprising a frame defining a peripheral flange having upstanding therefrom one or more walls defining an aperture, at least one said wall including one or more supports for a cover that is removably securable therein; and a surface access cover as described herein, or manufactured by a method as described herein, received in the said aperture.

[0074] Preferably the surface access assembly is installed adjacent a surface; has the peripheral flange of its frame embedded in a bonding medium contained by the surface; and has an edge of the upstanding wall generally coterminous with the surface.

[0075] In a preferred assembly according to the invention the skid resistance value of the in-use engageable surface of the cover body approximately matches the skid resistance value of the surface adjacent which the assembly is installed.

[0076] The foregoing features provide a surface access assembly including an access cover with a desired degree of skid resistance.

[0077] The covers forming the subject of the invention typically include a metal cover body, especially one that is made from or includes steel or (more preferably) cast iron.

[0078] There now follows a description of preferred embodiments of the invention, by way of non-limiting example, with reference being made to the accompanying drawings in which:

Figure 1 shows a side elevational, cross-sectioned view of a surface access cover according to one embodiment of the invention;

Figure 2 shows an enlarged portion of Figure 1;

Figure 3 shows a side elevational, cross-sectioned view of a surface access cover according to a further embodiment of the invention; and

Figure 4 shows an enlarged portion of Figure 3.

[0079] Referring to the drawing figures, a first embodiment surface access cover according to the invention is designated generally by the reference numeral 10. The surface access cover 10 comprises a metal (eg. cast iron) cover body 12 having secured on an in-use

upper surface thereof a primer layer 13. The primer layer 13 has secured to its upper surface a resin layer 14 having embedded therein a plurality of aggregate particles 15.

[0080] The resin layer defines an engageable surface of the access cover. Furthermore, at least some of the aggregate particles give rise to undulations in the engageable surface.

[0081] The depths of the various layers and dimensions and shape of the access covers are variable within the scope of the invention.

[0082] As shown in Figure 2, at least some of the aggregate particles 15 protrude beyond the resin 14.

[0083] The surface of the cover body 12 adjacent the primer layer 13 is substantially free from embossments and recesses.

[0084] The in-use engageable surface 16 of the access cover 10 has a skid resistance value in the range 55 to 60.

[0085] The cover body 12 includes a continuous wall 17 upstanding therefrom. Wall 17 substantially defines the perimeter of the resin layer 14.

[0086] The primer layer 13 is or includes a solvent-based rust-inhibiting primer.

[0087] The resin layer 14 is or includes a methyl methacrylate.

[0088] The aggregate particles 15 range in size from 1.0mm to 2.0mm when measured in their longest dimension.

[0089] The aggregate particles 15 may be Criggion, bauxite, foundry slag, or any mixture thereof.

[0090] In another embodiment of the invention (not shown in the drawings) the resin layer 14 may include one or more dyes or pigments. In addition, or alternatively, the aggregate particles 15 may also include one or more dyes or pigments. In this way the resin layer 14 and the aggregate particles 15 may emit or reflect incident light in a predetermined range of wavelengths.

[0091] The resin layer 14 and the aggregate particles 15 can emit or reflect light of generally the same range of wavelengths. Alternatively the range of wavelengths of light emitted or reflected by the resin layer 14 and the aggregate particles 15 can differ to an optically detectable extent. In this way the resin layer 14 and the aggregate particles 15 may appear the same colour or differing colours.

[0092] In a further embodiment of the invention (not shown in the drawings) the resin layer 14 may include a plurality of dyes or pigments whereby different areas of the resin layer 14 emit or reflect incident light in different predetermined ranges of wavelengths.

[0093] In addition, or alternatively, respective groups of the aggregate particles 15 may also include differing dyes or pigments whereby the respective groups emit or reflect different predetermined ranges of wavelengths of incident light. In this way the in-use engageable surface 16 can include various patterns, advertising logos or artworks.

[0094] A second embodiment of surface access cover 20 according to the invention is shown in Figure 3.

[0095] The surface access cover 20 comprises a metal (eg. cast iron) cover body 22 having secured on an in-use upper surface thereof a primer layer 23. The primer layer 23 has secured to its upper surface a resin layer 24 having embedded therein a plurality of aggregate particles 25. The resin layer defines an engageable surface of the access cover. At least some of the aggregate particles give rise to undulations in the engageable surface.

[0096] The surface of the cover body 22 adjacent the primer layer 23 is substantially free from embossments and recesses.

[0097] The in-use engageable surface 26 of the access cover 20 has a skid resistance value in the range 55 to 60.

[0098] The primer layer 23 is or includes a solvent-based rust-inhibiting primer.

[0099] The resin layer 24 is or includes a methyl methacrylate.

[0100] The aggregate particles 25 range in size from 0.5mm to 0.8mm when measured in their longest dimension.

[0101] The aggregate particles 15 may be Criggion, bauxite, foundry slag, or any mixture thereof.

[0102] In another embodiment of the invention (not shown in the drawings) the resin layer 24 may include one or more dyes or pigments. In addition, or alternatively, the aggregate particles 25 may also include one or more dyes or pigments. In this way the resin layer 24 and the aggregate particles 25 may emit or reflect incident light in a predetermined range of wavelengths.

[0103] The resin layer 24 and the aggregate particles 25 can emit or reflect light of generally the same range of wavelengths. Alternatively the range of wavelengths of light emitted or reflected by the resin layer 24 and the aggregate particles 25 can differ to an optically detectable extent. In this way the resin layer 24 and the aggregate particles 25 may appear the same colour or differing colours.

[0104] In a further embodiment of the invention (not shown in the drawings) the resin layer 24 may include a plurality of dyes or pigments whereby different areas of the resin layer 24 emit or reflect incident light in different predetermined ranges of wavelengths.

[0105] In addition, or alternatively, respective groups of the aggregate particles 25 may also include differing dyes or pigments whereby the respective groups emit or reflect different predetermined ranges of wavelengths of incident light. In this way the in-use engageable surface 26 can include various patterns, advertising logos or artworks.

[0106] The method of manufacturing the access cover 10 of Figure 1 includes the steps of, after forming the cover body 12 eg. by casting from iron or fabricating from steel: scavenging contaminants from a surface of a cover body 12; applying a primer layer 13 to at least

part of the scavenged surface, eg. by brushing, spraying or pouring; coating at least part of the primer layer 13 with a mix of a curable resin 14 and aggregate particles 15 to define an in-use engageable surface 16; and allowing the resin 14 to cure with at least some aggregate particles 15 giving rise to undulations in the engageable surface (Figure 2).

[0107] The step of coating the primer layer 13 with a mix of resin and aggregate particles includes applying a curable resin layer 14 to the primer layer 13 and, before curing thereof, casting a plurality of aggregate particles 15 into the resin layer 14.

[0108] A further embodiment of the method includes the step of, before the step of allowing the resin to cure, applying a force to the aggregate particles 15 on an upwardly facing surface of the uncured resin by means of eg. a roller, whereby the said aggregate particles 15 become more fully embedded in the resin layer 14.

[0109] In the method of making the access cover 10 of Figure 1, the aggregate particles 15 are cast into the resin layer 14 until the resin layer 14 is saturated with aggregate particles.

[0110] Any of the foregoing embodiments of the method include the step of removing any excess aggregate particles 15 after the resin has cured.

[0111] The resin layer 14 may be applied by hand or by airless spray.

[0112] Airless spraying is a spray technique using a piston pump operating at eg. 13.8Mpa (2000psi).

[0113] Furthermore, in any foregoing embodiment of the method the primer is or includes a solvent-based rust-inhibiting primer.

[0114] The resin used is or includes a methyl methacrylate.

[0115] The aggregate particles 15 range in size from 1.0mm to 2.0mm when measured in their longest dimension. In addition, the aggregate particles 15 may be Criggion; bauxite; foundry slag; any mixture thereof; or other aggregates.

[0116] Another embodiment of the method includes one or both of the following steps: adding one or more dyes or pigments to the resin 14; and adding one or more dyes or pigments to at least some of the aggregate particles 15.

[0117] Similar dyes or pigments may be added to both the resin 14 and the aggregate particles 15. Alternatively, differing dyes or pigments may be added respectively to the resin and the aggregate particles 15. In this way the resin layer 14 and the aggregate particles 15 may appear to look the same colour or differing colours.

[0118] In addition, it is possible to add different dyes or pigments to respective volumes of the resin 14, or add different dyes or pigments to respective groups of the aggregate particles 15.

[0119] A further embodiment of the method of the invention includes the use of at least one template to form patterns, advertising logos or artwork in the mix of resin and aggregate particles adjacent to the primer layer.

[0120] The method of manufacturing the access cover 20 of Figure 3 includes the steps of, after forming the cover body 22 eg. by casting from iron or fabricating from steel: scavenging contaminants from a surface of a cover body 22; applying a primer layer 23 to at least part of the scavenged surface, eg. by brushing, spraying or pouring; coating at least part of the primer layer 23 with a mix of a curable resin 24 and aggregate particles 25 to define an in-use engageable surface 26; and allowing the resin 24 to cure with at least some aggregate particles 25 giving rise to undulations in the engageable surface (Figure 4).

[0121] The step of coating the primer layer 23 with a mix of resin and aggregate particles includes mixing at least some aggregate particles 25 into a curable resin 24 before applying the mixture to the primer layer 23.

[0122] Before the step of allowing the resin to cure, a force is applied to an upwardly facing surface of the mix of resin and aggregate particles adjacent to the primer by means of eg. a roller, whereby the mix is evenly distributed.

[0123] The thickness of the resin layer 24 is at least 0.6mm.

[0124] The resin 24 and aggregate particle 25 mixture may be applied by hand or by airless spray.

[0125] The primer is or includes a solvent-based rust-inhibiting primer.

[0126] The resin used is or includes a methyl methacrylate.

[0127] The aggregate particles 25 range in size from 0.5mm to 0.8mm when measured in their longest dimensions. In addition, the aggregate particles 25 may be Criggion; bauxite; foundry slag, any mixture thereof; or other aggregates.

[0128] Another embodiment of the method includes one or both of the following steps: adding one or more dyes or pigments to the resin 24; and adding one or more dyes or pigments to at least some of the aggregate particles 25.

[0129] Similar dyes or pigments may be added to both the resin 24 and the aggregate particles 25. Alternatively, differing dyes or pigments may be added respectively to the resin 24 and the aggregate particles 25. In this way the resin layer 24 and the aggregate particles 25 may appear to look the same colour or differing colours.

[0130] In addition, it is possible to add different dyes or pigments to respective volumes of the resin 24, or add different dyes or pigments to respective groups of the aggregate particles 25.

[0131] A further embodiment of the method includes the use of at least one template to form patterns, advertising logos or artwork in the mix of resin 25 and aggregate particles 25 adjacent to the primer layer 23.

[0132] A surface access assembly according to the invention comprises a frame defining a peripheral flange having upstanding therefrom one or more walls defining a aperture, at least one said wall including one or more supports for a cover that is removably securable therein;

and a surface access cover 10,20 according to any of the embodiments herein described, or manufactured by a method according to any of the methods herein described, received in the said aperture.

[0133] The surface access assembly of the invention is installed adjacent a surface; has the peripheral flange of its frame embedded in a bonding medium contained by the surface; and has an edge of the upstanding wall generally coterminous with the surface.

[0134] In a further embodiment of the assembly the skid resistance value of the in-use engageable surface 16,26 of the cover body 10,20 approximately matches the skid resistance value of the surface adjacent to which the assembly is installed.

[0135] A pedestrian may encounter a surface access cover 10,20 of the invention in a pavement installation. The SRV of the in use engageable surface 16,26 of the access cover 10,20 will approximately match the SRV of the pavement. The pedestrian walking from the pavement onto the access cover 10,20 will easily accommodate any minor change in the coefficient of friction. In this way, the pedestrian is much less likely to slip and lose his footing.

[0136] A driver, rider or cyclist is likely to encounter a surface access cover 10,20 according to the invention in a roadway, yard or garage installation. An access cover of this type will have a SRV that closely matches the SRV of the surface. Each tyre of the vehicle or bicycle will encounter substantially the same, uniform coefficient of friction. As a result the vehicle or bicycle will react in a uniform and expected manner under acceleration, braking and/or cornering. The driver or rider will not experience an unnerving sensation as one tyre skids on a surface that is considerably less skid resistant than the adjacent surface.

Claims

1. A surface access cover comprising a cover body having secured on a surface thereof a primer layer, the primer layer having secured thereto a resin layer that defines an in-use engageable surface of the access cover, the resin layer having embedded therein at least adjacent the said engageable surface a plurality of aggregate particles at least some of which give rise to undulations in the engageable surface ; and the primer serving to bond the resin layer to the cover body.

2. A surface access cover according to Claim 1, wherein at least some of the aggregate particles protrude beyond the resin.

3. A surface access cover according to Claim 1 or Claim 2 wherein the surface of the cover body adjacent the primer layer is substantially free of embossments and recesses.

4. A surface access cover according to any preceding claim having a skid resistance value in the range 55 to 60.

5. A surface access cover according to any preceding claim wherein the cover body includes a wall upstanding therefrom, the wall substantially defining the perimeter of the resin layer.

6. A surface access cover according to any preceding claim wherein the primer layer is or includes a solvent-based rust-inhibiting primer.

7. A surface access cover according to any preceding claim wherein the resin layer is or includes a methyl methacrylate.

8. A surface access cover according to any preceding claim wherein the aggregate particles range in size from 0.5mm to 2.0mm when measured in their longest dimension.

9. A surface access cover according to any preceding claim wherein the aggregate particles are or include Criggion.

10. A surface access cover according to any preceding claim, wherein the aggregate particles are or include bauxite

11. A surface access cover according to any preceding claim wherein the aggregate particles are or include foundry slag.

12. A surface access cover according to any preceding claim wherein at least part of the resin layer includes one or more dyes or pigments whereby the said part of the resin layer emits or reflects incident light in a predetermined range of wavelengths.

13. A surface access cover according to any preceding claim wherein at least some of the aggregate particles include one or more dyes or pigments so as to emit or reflect incident light in a predetermined range of wavelengths.

14. A surface access cover according to Claim 12 and Claim 13 wherein the range of wavelengths of light emitted or reflected by the resin layer is generally the same as the range of wavelengths emitted or reflected by the aggregate particles.

15. A surface access cover according to Claim 12 and Claim 13 wherein the range of wavelengths of light emitted or reflected by the resin layer differs from the range of wavelengths emitted or reflected by the aggregate particles to an optically detectable extent.

16. A surface access cover according to any of Claims 1 to 11 wherein the resin layer includes a plurality of dyes or pigments whereby different areas of the resin layer emit or reflect incident light in different predetermined ranges of wavelengths.

17. A surface access cover according to any of Claims 1 to 12 or Claim 16 wherein respective groups of the aggregate particles include differing dyes or pigments whereby the respective groups emit or reflect different predetermined ranges of wavelengths of incident light.

18. A method of making a surface access cover comprising the steps of:

a) scavenging contaminants from a surface of a cover body;
b) applying a primer layer to at least part of the scavenged surface;
c) coating at least part of the primer layer with a mix of a curable resin and aggregate particles to define an in-use engageable surface; and
d) allowing the resin to cure with at least some aggregate particles giving rise to undulations in the engageable surface.

19. A method according to Claim 18 wherein step (c) includes applying a curable resin layer to the primer layer and, before curing thereof, casting a plurality of aggregate particles into the resin layer.

20. A method according to Claim 18 wherein step (c) includes mixing at least some aggregate particles into a curable resin before applying the mixture to the primer layer.

21. A method of making a surface access cover according to any preceding claim including the step of, before step (d), applying a force to the mix of resin and aggregate particles adjacent to the primer layer.

22. A method according to Claim 18 or Claim 19 wherein the aggregate particles are cast into the resin layer until the resin layer is saturated with cast aggregate particles at least adjacent the surface thereof via which the aggregate particles are cast.

23. A method according to any of Claim 18, Claim 19, Claim 21 or Claim 22 including the step of removing any excess aggregate particles after step (d).

24. A method according to any of Claim 18, Claim 20, or Claim 21 wherein the thickness of the resin layer is at least 0.6mm.

25. A method according to any of Claim 18, Claim 19 or Claims 21 to 23 wherein the resin layer is applied by hand.

26. A method according to any of Claim 18, Claim 20, Claim21 or Claim 24 wherein the resin and aggregate particle mixture is applied by hand.

27. A method according to any of Claim18, Claim 19, Claim 22 or Claim 23 wherein the resin layer is applied by airless spray.

28. A method according to any of Claim 18, Claim 20, Claim 21 or Claim 24 wherein the resin and aggregate particle mixture is applied by airless spray.

29. A method according to any of Claims 18 to 28 wherein the primer is or includes a solvent-based rust-inhibiting primer.

30. A method according to any of Claims 18 to 29 wherein the resin is or includes a methyl methacrylate.

31. A method according to any of Claims 18 to 30 wherein the aggregate particles range in size from 0.5mm to 2.0mm when measured in their longest dimension.

32. A method according to any of Claims 18 to 31 wherein the aggregate particles are or include Criggion.

33. A method according to any of Claims 18 to 32 wherein the aggregate particles are or include bauxite.

34. A method according to any of Claims 18 to 33 wherein the aggregate particles are or include foundry slag.

35. A method according to any of Claims 18 to 34 including the step of, before step (c), adding one or more dyes or pigments to the resin.

36. A method according to any of Claims 18 to 35 including the step of, before step (c), adding one or more dyes or pigments to at least some of the aggregate particles.

37. A method according to any of Claims 18 to 36 including before step (c), one or more of the following steps:

(e) adding similar dyes or pigments to both the resin and at least some of the aggregate particles;
(f) adding differing dyes or pigments respectively to the resin and at least some of the aggregate particles;

(g) adding differing dyes or pigments to respective regions of the resin; or
(h) adding differing dyes or pigments to respective groups of the aggregate particles.

38. A method according to any of Claims 18 to 37 wherein step (c) includes the use of at least one template to form patterns, advertising logos or artwork in the mix of resin and aggregate particles adjacent to the primer layer.

39. A surface access assembly comprising a frame defining a peripheral flange having upstanding therefrom one or more walls defining a aperture, at least one said wall including one or more supports for a cover that is removably securable therein; and a surface access cover according to any of Claims 1 to 17 or manufactured by a method according to any of Claims 18 to 38 received in the said aperture.

40. A surface access assembly according to Claim 39 that is installed adjacent a surface; has the peripheral flange of its frame embedded in a bonding medium contained by the surface; and has an edge of the upstanding wall generally coterminous with the surface.

41. A surface access assembly according to Claim 39 or Claim 40 wherein the skid resistance value of the in-use engageable surface of the cover body approximately matches the skid resistance value of the surface adjacent to which the assembly is installed.

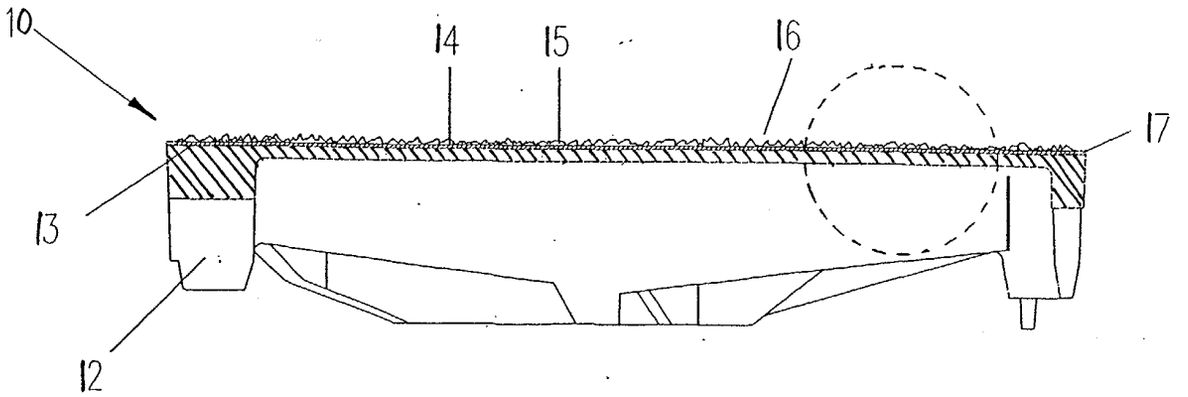

Figure 1

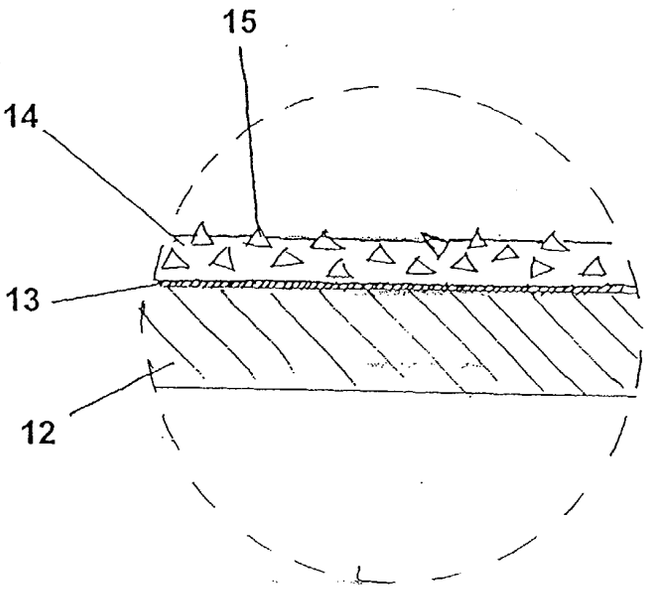

Figure 2

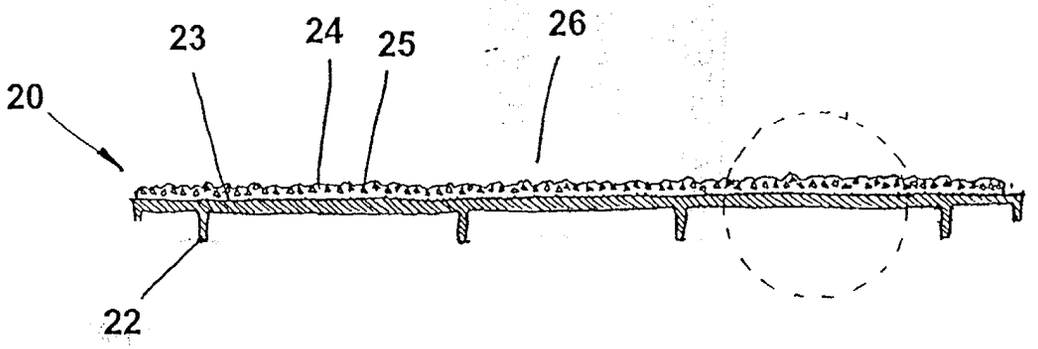

Figure 3

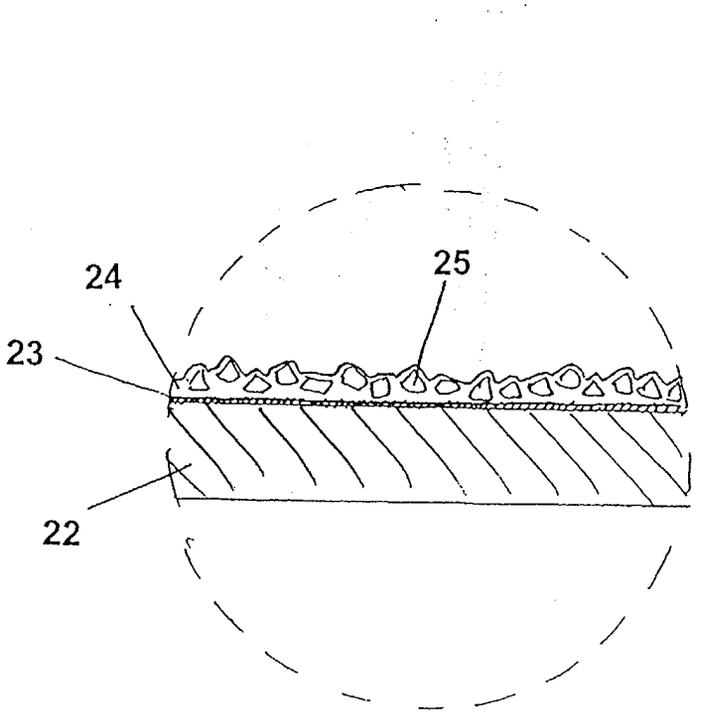

Figure 4