(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 631 363 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
13.05.2015 Bulletin 2015/20

(51) Int Cl.:
E01C 3/06 *(2006.01)*

(21) Application number: **13156072.4**

(22) Date of filing: **21.02.2013**

(54) **Road construction and use of insulation plate in road construction**

Verfahren zum Bau von Strassen und Verwendung von Isolierplatten dafür

Procédé de construction des routes et utilisation de blocs isolants dans ce procédé

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **21.02.2012 FI 20125201**

(43) Date of publication of application:
28.08.2013 Bulletin 2013/35

(73) Proprietor: **Finnfoam Oy**
24100 Salo (FI)

(72) Inventor: **Nieminen, Henri**
24130 Salo (FI)

(74) Representative: **Turun Patenttitoimisto Oy**
P.O. Box 99
20521 Turku (FI)

(56) References cited:
EP-A1- 2 093 332
DE-A1- 19 647 981
NL-C- 2 004 245
WO-A1-97/43498
JP-A- H 084 012
US-A- 6 146 054

EP 2 631 363 B1

Printed by Jouve, 75001 PARIS (FR)

Description

Field of the invention

[0001] The invention relates to a road construction and use of an insulation plate manufactured of cellular plastic in a road construction according to the preamble of claim 1.

[0002] Such a road construction is described in NL 2004 245C, WO 97/43498 A1 and US 6 146 054 A.

Background of the invention

[0003] In the infraconstruction, the construction layers of roads and the like must be carried out carefully, since otherwise the load caused by the traffic will break the road surface. The road soil consisting of natural materials, such as clay, can be naturally soft and weakly bearing, as a consequence of which such road soil construction is weakly load-bearing. In cold areas also the freezing of the soil, i.e. frost and melting of frost, causes movement of soil elements and thus damages the road soils.

[0004] In frost susceptible soil bases, the risk of surface damages in road, street and residential area is high. When repairing the street or yard damaged by frost, it is not expedient to repair them only by resurfacing, but it will also be necessary to improve the frost protection of the construction. Frost damages are caused by oversized frost heave, which can be reduced by frost protection.

[0005] In road and yard construction, thick rock material layers are typically used against humidity and frost attacks, but the thickness of the construction will then become remarkably high. The frost protection can be realized when constructing or repairing streets and yards also by using frost insulation plates. Typically, XPS (extruded polystyrene) plates have been used as a frost insulation of the road construction. These plates distribute fairly little traffic loads to a wider area in the soil base. If the bearing of the soil base is weak, ruts start to form to the road in the course of time, since the soil base will be unevenly indented as a result of the load.

[0006] Also plates or blocks made of expanded polystyrene (EPS) are often used as lightweight fill materials in road constructions. Such EPS layers usable in soil constructions become, however, easily remarkably thick. Furthermore, the problem is that the plates collapse due to the load directed to the road, and consequently also the road soil structure collapses, which causes also damaging of the road surface layer. With EPS lightweight fill material layers, also a structure supporting steel wire net, concrete tile or other structure bracing the upper part of the construction, is needed for the road construction, so the implementation of the construction requires many working phases.

Object and description of the invention

[0007] An object of the present invention is to reduce or even eliminate the above-mentioned problems appearing in prior art.

[0008] An object of the present invention is to achieve a sufficiently firm road construction, which distributes the load evenly to the soil base and which withstands the load of the vehicle traffic.

[0009] An object of the present invention is also to achieve a simple, cost-effective and easily implementable road construction, with which also a good frost protection is achieved.

[0010] In order to implement the above-mentioned objects, among other things, the road construction according to the invention is characterized by what is presented in the characterizing part of the enclosed independent claim 1.

[0011] The other, dependent claims present some preferred embodiments of the invention.

[0012] A typical road construction according to the invention comprises a first edge and a second edge in the lateral direction of the road, and at least a road surface layer and construction layers and an insulation layer are arranged under the surface layer. The insulation layer has been formed by arranging at least one layer of plates over the substantial width defined by the first and the second edge of the road construction, which plates comprise an insulation layer made of cellular plastic which is extruded polystyrene and the first planar surface and the second planar surface of which insulation layer comprise a structure reinforcing alkali protected glass fiber mat, which is attached to the insulation layer with a coating material, such as concrete, mortar or adhesive mass.

[0013] An object of the invention is also the use of the insulation plate, which comprises an insulation layer made of cellular plastic which is extruded polystyrene, and the first planar surface and the second planar surface of which insulation layer comprise a structure reinforcing alkali protected glass fiber mat, which is attached to the insulation layer with a coating material, such as concrete, mortar or adhesive mass, under the surface layer in the road and soil construction.

[0014] The road construction according to the invention is based on the fact that with the aid of the cellular plastic plates to be arranged in the construction and which plates are coated with fiber mat, the distribution capability of the point loads of the frost insulation/lightweight fill material in the road construction can be improved, whereby the forming of ruts does not occur at least due to uneven collapse of the soil base, but because of the plates used in the invention the load may be evenly distributed over the entire width of the road, whereby the collapse of the foundation soil occurs evenly. Thus, the damaging and rutting of the road surface layer can be prevented. The bending strength of the coated plates made of cellular plastic used in the invention is good, as a consequence of which a supporting road construction can be achieved, since the coated plates to be used do not stretch or collapse due to the load and thus don't cause any damaging of the road construction. An espe-

cially supporting road structure is achieved by arranging one or more layers of coated plates in the road soil construction. The use of firm insulation plates according to the invention in the road construction enables also the use of a rougher filling material for filling the road soil, which again brings cost savings for the material costs of the road construction.

[0015] In the road construction according to the invention cellular plastic plates coated with fiber mat act as a frost insulation and lightweight fill material as well as a stiffener of the road construction, so that with the insulation layer according to the invention the road construction can be made firm and the frost heaving can be prevented or restricted in the soil under the road construction. The solution according to the invention simplifies and accelerates the building of the road construction, since it is not necessary to install any separate frost insulation or lightweight fill material and reinforcing structure, such as steel wire net, concrete tile or other stiffness improving structure, in the construction, but the desired properties can be included in the construction by one installation by using one kind of plates, which have the required properties.

[0016] The invention is especially based on the fact, that the bending strength of the insulation plate acting as a frost insulator or lightweight fill material has been enhanced by the plate coating. Thus, the properties of the cellular plastic plates fulfill the properties required in the road construction.

[0017] In this application cellular plastic refers to plastics of which controllably foamy materials have been made. In the road construction according to the invention the insulation plate has a sufficient compression strength, which can vary between ca. 100-700 kPa depending on the load level of the road construction.

[0018] Most typically the plates are prepared from a plate made of extruded polystyrene, i.e. XPS plate.

[0019] Extruded polystyrene (XPS) suits especially for the road construction, since its cellular structure is closed and uniform, and therefore water can't pass through the plate. This way the plate remains dry and doesn't get water-logged in the road construction and thus its insulation capacity remains good for decades.

[0020] Typically, plates, which comprise a first planar surface and a second planar surface and outer edges defining the plate, are used in the road construction according to the invention. Typically, the plates are substantially rectangular or quadrangle in form. The first planar surface and the second planar surface of the plate made of cellular plastic, i.e. the so called insulation layer of the plate, are substantially entirely coated with a reinforcing fiber mat or similar structure reinforcing the construction, such as a fiber network or fiber web, so that it has been possible to enhance the bending strength and tensile strength of the plate made of cellular plastic. In an embodiment of the invention the plates are coated at least on their one surface with one, two or more reinforcing fiber mat layers. Typically, the plates are coated on their both surfaces with one or two reinforcing fiber mat layers. The fiber mat and the fiber mat layers are attached to the surface of the insulation layer with coating material, such as concrete, mortar or adhesive mass. The adhesive mass can be for example a polyurethane adhesive mass.

[0021] In the invention glass fiber network is used for coating of plates. The plates according to the invention typically comprise a netlike fiber mat, which is formed of individual fibers or fiber strands. The diameter of the fiber used in the fiber network is typically 0.2-3 mm, most typically 1-3 mm. The mesh size of the fiber network is typically 3 × 3 mm-20 × 20 mm. The fiber mat or the fiber mat layers are attached to the insulation layer with coating material, such as concrete, mortar or adhesive mass. The thickness of the concrete, mortar or adhesive mass layer used for attaching is substantially the same as the diameter of the fiber of the used fiber mat or the thickness of the fiber mat layers, i.e. the fiber mat or the fiber mat layers substantially set into the concrete, mortar or adhesive mass layers.

[0022] In the invention the plates made of cellular plastic are coated with alkali protected glass fiber network, whereby the strength of the plates is enhanced. XPS plates are used, the planar surfaces of which plates comprise an alkali protected glass fiber mat, which is attached to the XPS insulation layer with concrete, mortar or adhesive mass. In a typical embodiment the XPS plate is coated on its both surfaces with one or two alkali protected glass fiber network layers.

[0023] In a construction according to the invention the thickness of the insulation layer of the plate used is typically 10-200 mm, more typically 20-120 mm and most typically 50-100 mm.

[0024] The length of the long side edges of the rectangular plate is typically 700-4000 mm, more typically 1000-3000 mm and most typically 1200-2600 mm. The length of the short side edges of the plate is typically 300-1500 mm, more typically 500-1300 mm and most typically 600-1200 mm.

[0025] In the road construction according to the invention the insulation layer of the road construction is typically formed of one, two or more superposed plates. Typically, one layer of plates is arranged over the substantial width of the entire road construction. The insulation layer can comprise at least over a part of the width of the road construction at least two layers of superposed plates made of cellular plastic, or the insulation layer can comprise over the entire width of the road construction at least two layers of superposed plates made of cellular plastic. The necessary insulation layer depends on the load of the road or yard area.

[0026] In the road construction according to the invention the plates of the superposed layers are placed staggered, so that the joints between the plates are not aligned in different layers. Plates are typically placed substantially over the entire width of the road construction in the direction of the plane of the road surface. Typically, same number of layers of plates are placed over the en-

tire width of the road construction. When placing several layers of plates, the width of the layers formed by the plates can differ from each other, whereby for example a part of the layers is slightly wider or narrower than the width of the road to be constructed, since whole plates of the same size are typically used in the construction, whereby the width of the layer can vary due to the staggered joints. The width of the successive rows formed by the plates can also vary in the longitudinal direction of the road construction. The plates of the superposed layers can also be placed divergently in the construction, for example when using rectangular plates in one layer, the longer side of the plates is in the lateral direction of the road and in the second layer in the longitudinal direction of the road.

[0027] In an embodiment of the invention one continuous layer of plates is arranged substantially over the entire area of the road construction and on this continuous layer an additional layer or layers of plates is placed only to those places, to which the biggest part of the load is directed. This construction thus comprises one continuous layer formed of plates and a second layer on the continuous layer, which layer is not continuous in the lateral direction of the road, but typically comprises 2, 3 or 4 sections formed of insulation plates in the lateral direction of the road. In this embodiment the spaces between the sections formed by the plates of the second insulation plate layer are filled with the road construction material. With the aid of the coated plates the stress caused by the load can be distributed to a wider area and by arranging several layers of plates at least to those places, to which the biggest stress is directed, an especially supporting road construction can be achieved.

[0028] The total thickness of the supporting structure formed by the plates is typically about 50-400 mm and more typically 100-200 mm. The total thickness formed by the plates can vary in the lateral direction of the road. The total thickness of the layer formed by the plates depends among other things on the load of the road or street. A heavily trafficked street or road needs a thicker supporting layer than a courtyard road.

[0029] In a typical road construction according to the invention the plates are arranged 20-100 cm, typically 30-70 cm under the surface layer of the road. Typically, there is a construction material layer, such as gravel, crushed stone, sand or other stone material, between the surface layer and the plates of the road construction. This construction material layer is applied and compacted on the insulation plates and it acts as a supporting layer of the road construction, on which layer the required surface layer or surface layers are placed.

[0030] In a construction according to the invention the plates can have evenly flattened edges, whereby the plates are placed tightly against each other in the construction by using a butt joint. In a preferred embodiment of the invention the adjacent/successive plates are attached to each other by a tongue-and-groove-joint, whereby the plates remain better in their places. Thus, the plates are connected to each other by a locked tongue-and-groove-joint.

[0031] In a road construction according to the invention a levelling course has typically been applied under the plates, which levelling course is sand or other stone material. This levelling course is formed on the soil base and its thickness is typically at least 20 cm, more typically about 30 cm. The insulation plates are placed on this levelling course.

[0032] The thickness of the construction layers (supporting layer and levelling course) of the road construction according to the invention depends on the expected traffic of the road to be constructed, the heavier the traffic, the more supportive, i.e. thicker the layers of the road construction must be.

[0033] The road surface layer can be the same or different material than the other road construction material. The surface layer can be any coating suitable for the purpose of use, such as for example asphalt or gravel. The construction can also be used under other constructions, such as set pavements.

[0034] The method for supporting the road construction typically comprises at least the following steps:

- soil is removed from the place of the road, street or yard area to be constructed or repaired, mainly over the entire width of the place to be constructed,
- a uniform construction material layer, a so-called levelling course, is arranged on the bottom of the cavity formed due to the removal of the soil,
- at least one layer of coated plates made of cellular plastic according to the invention is arranged on the construction material layer,
- construction material, a so-called supporting layer, is arranged on the plates, and
- a road surface layer is arranged on the construction material.

[0035] The road construction according to the invention can be used in connection with all kinds of traffic routes, such as roads, streets, highways, courtyard roads and other similar constructions, where it is necessary to reinforce the construction and prevent uneven collapse of the construction and at the same time form a required frost protection. The road construction refers in this application to a road construction as well as to a street construction or a yard construction.

[0036] With the construction according to the invention cost savings can be obtained for the frost protection of the road constructions.

Short description of the figures

[0037] The invention is described in the following exemplary figures, in which

Figure 1 shows a plate to be used in a road construction according to the invention,

Figure 2 shows a road construction according to the invention in a schematic cross-sectional view, and

Figure 3 shows another road construction according to the invention.

Detailed description of the invention

[0038] Fig. 1 shows a plate 1 to be used in a road construction according to the invention, which plate comprises an insulation layer 2, which has a first planar surface 3 and a second planar surface 4. The insulation layer 2 of the plate is made of extruded polystyrene (XPS). The planar surfaces 3, 4 of the insulation layer comprise a reinforcing fiber mat, which is attached to the insulation layer with concrete, mortar or adhesive mass. The edges of the plate shown in Fig. 1 are flattened, but they can be shaped, when necessary, to comprise grooves which enable a tongue-and-groove joint.

[0039] Fig. 2 shows by way of an example a road construction according to the invention, where cellular plastic plates of Fig. 1 are placed as a supporting structure in the soil base. The purpose of the figure is to illustrate the location of the plates in the road construction. First, soil base 8 has been removed from the place of the road construction to be and a first construction material layer 7, a so-called levelling course, which is typically sand or other stone material, has been arranged in the place of the removed soil. An insulation layer supporting the road construction formed of coated cellular plastic plates 1, 1' according to the invention has been arranged on this stone material layer. In Fig. 2 two layers of plates 1, 1' have been arranged in the construction, which plates are tightly set against each other, so that the joints between the plates of the superposed layers are staggered. Plates 1, 1' are substantially arranged over the entire width of the road construction. The second construction material layer 6 is arranged on the plates 1, 1'. The surface layer 5 of the road construction is formed on this construction material layer.

[0040] Figure 3 shows another road construction according to the invention. Construction material 6 and frost insulation plates 1, 1' according to the invention supporting the construction are arranged under the road surface construction layer 5. Plates 1, 1' are arranged in the construction such that they form one uniform layer substantially over the entire width of the road construction and on this uniform layer plates are arranged to those places 9, 9', to which the biggest load is presumably directed in the road construction. The load is caused by the vehicles 10, 10' using the road, the load of which vehicles is typically distributed to the places of the wheel tracks formed by the vehicles. The plates 1, 1' distribute the load caused by the vehicles over a wide area, as a consequence of which the possible collapse of the road construction occurs evenly over the entire width of the road construction.

[0041] The invention is not intended to be limited to the above-presented exemplary embodiments, but the intention is to apply the invention widely within the inventive idea defined by the claims defined below.

Claims

1. Road construction comprising a first edge and a second edge in the lateral direction of the road and which construction comprises at least a road surface layer (5) and construction layers (6, 7) and an insulation layer arranged under the surface layer, wherein the insulation layer is formed by arranging at least one layer of plates (1, 1') over the substantial width defined by the first and the second edge of the road construction, which plates comprise an insulation layer (2) made of cellular plastic, **characterized in that** said cellular plastic is extruded polystyrene, and **in that** the first planar surface (3) and the second planar surface (4) of which insulation layer comprises a structure reinforcing alkali protected glass fiber mat, which is attached to the insulation layer (2) with a coating material, such as concrete, mortar or adhesive mass.

2. Road construction according to claim 1, **characterized in that** the insulation layer comprises at least over a part of the width of the road construction at least two superposed layers of plates (1, 1') made of cellular plastic.

3. Road construction according to claim 1, **characterized in that** the insulation layer comprises over the entire width of the road construction at least two superposed layers of plates (1, 1') made of cellular plastic.

4. Road construction according to any of the preceding claims, **characterized in that** the plates (1, 1') comprise at least on their one surface two or more fiber mat layers.

5. Road construction according to any of the preceding claims, **characterized in that** the glass fiber mat is a network structure, the mesh size of which is 3 mm × 3 mm-20 mm × 20 mm.

6. Road construction according to any of the preceding claims, **characterized in that** the plates (1, 1') are arranged 20-100 cm, typically 30-70 cm under the surface layer (5).

7. Road construction according to any of the preceding claims 2-6, **characterized in that** the plates (1, 1') of the superposed layers are placed staggered so that the joints between the plates (1, 1') are not in alignment in different layers.

8. Road construction according to any of the preceding

claims, **characterized in that** in the insulation layer the adjacent/successive plates (1, 1') are attached to each other with a tongue-and-groove joint.

9. Use of an insulation plate (1, 1') comprising an insulation layer (2) made of cellular plastic which is extruded polystyrene, and the first planar surface (3) and the second planar surface (4) of which insulation layer comprises a structure reinforcing alkali protected glass fiber mat which is attached to the insulation layer (2) with a coating material, such as concrete, mortar or adhesive mass, in the road and soil construction under the surface layer (5).

Patentansprüche

1. Straßenkonstruktion, umfassend einen ersten Rand und einen zweiten Rand in lateraler Richtung der Straße, wobei die Konstruktion zumindest eine Straßenoberflächenschicht (5) und Konstruktionsschichten (6, 7) und eine unter der Oberflächenschicht angeordnete Isolationsschicht umfasst, wobei die Isolationsschicht durch Anordnung mindestens einer Lage aus Platten (1, 1') über die wesentliche Breite, definiert durch den ersten und den zweiten Rand der Straßenkonstruktion, gebildet wird, wobei die Platten eine Isolationsschicht (2), hergestellt aus geschäumtem Kunststoff, umfassen, **dadurch gekennzeichnet, dass** der geschäumte Kunststoff extrudiertes Polystyrol ist, und dass die erste ebene Oberfläche (3) und die zweite ebene Oberfläche (4) der Isolationsschicht eine strukturverstärkende, alkaligeschützte Glasfasermatte umfassen, welche an der Isolationsschicht (2) mit einem Beschichtungsmaterial, wie Beton, Mörtel oder Haftmasse angebracht ist.

2. Straßenkonstruktion nach Anspruch 1, **dadurch gekennzeichnet, dass** die Isolationsschicht zumindest über einen Teil der Breite der Straßenkonstruktion zumindest zwei übereinanderliegende Lagen von Platten (1, 1'), bestehend aus geschäumtem Kunststoff, umfasst.

3. Straßenkonstruktion nach Anspruch 1, **dadurch gekennzeichnet, dass** die Isolationsschicht über die gesamte Breite der Straßenkonstruktion zumindest zwei übereinanderliegende Lagen von Platten (1, 1'), bestehend aus geschäumtem Kunststoff, umfasst.

4. Straßenkonstruktion nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Platten (1, 1') zumindest auf ihrer einen Oberfläche zwei oder mehr Fasermattenschichten umfassen.

5. Straßenkonstruktion nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Glasfasermatte eine Netzwerkstruktur ist, wobei deren Maschen eine Größe von 3 mm x 3 mm - 20 mm x 20 mm aufweisen.

6. Straßenkonstruktion nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Platten (1, 1') 20-100 cm, typischerweise 30-70 cm unter der Oberflächenschicht (5) angeordnet sind.

7. Straßenkonstruktion nach einem der vorhergehenden Ansprüche 2-6, **dadurch gekennzeichnet, dass** die Platten (1, 1') der übereinanderliegenden Schichten versetzt angeordnet sind, so dass die Fugen zwischen den Platten (1, 1') in verschiedenen Schichten nicht fluchtend sind.

8. Straßenkonstruktion nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** in der Isolationsschicht die angrenzenden/aufeinanderfolgenden Platten (1, 1') mit einer Nut-Feder-Verbindung aneinander befestigt sind.

9. Verwendung einer Isolationsplatte (1, 1'), umfassend eine Isolationsschicht (2), bestehend aus geschäumtem Kunststoff, der extrudiertes Polystyrol ist, wobei die erste planare Oberfläche (3) und die zweite planare Oberfläche (4) der Isolationsschicht eine strukturverstärkende, alkaligeschützte Glasfasermatte umfassen, welche an der Isolationsschicht (2) mit einem Beschichtungsmaterial, wie Beton, Mörtel oder Haftmasse angebracht ist, in der Straße und im Erdbau unter der Oberflächenschicht (5).

Revendications

1. Structure de route comprenant un premier bord et un second bord dans la direction latérale de la route, ladite structure de route comprenant au moins une couche de surface de route (5) et des couches de construction (6, 7) et une couche d'isolation disposée sous la couche de surface, **caractérisée en ce que** la couche d'isolation est formée en agençant au moins une couche de plaques (1, 1') sur la grande largeur définie par le premier et le second bord de la structure de route, lesdites plaques comprenant une couche d'isolation (2) constituée d'une matière plastique cellulaire, ladite matière plastique cellulaire étant du polystyrène extrudé et **caractérisé en ce que** la première surface plane (3) et la seconde surface plane (4) dont la couche d'isolation comprend une structure de renforcement en natte de fibres de verre résistante aux alcalis, laquelle est fixée à la couche d'isolation (2) avec un matériau de revêtement, tel que du béton, du mortier ou une masse

adhésive.

2. Structure de route selon la revendication 1, **caractérisée en ce que** la couche d'isolation comprend sur au moins une partie de la largeur de la structure de route au moins deux couches superposées de plaques (1, 1') faites de matière plastique cellulaire.

3. Structure de route selon la revendication 1, **caractérisée en ce que** la couche d'isolation comprend sur toute la largeur de la structure de route au moins deux couches superposées de plaques (1, 1') constituées de matière plastique cellulaire.

4. Structure de route selon l'une quelconque des revendications précédentes, **caractérisée en ce que** les plaques (1, 1') comprennent au moins sur leur première surface deux ou plusieurs couches de nattes de fibres.

5. Structure de route selon l'une quelconque des revendications précédentes, **caractérisée en ce que** la natte de fibres de verre est une structure en réseau, dont la dimension de maille est comprise entre 3 mm x 3 mm et 20 mm x 20 mm.

6. Structure de route selon l'une quelconque des revendications précédentes, **caractérisée en ce que** les plaques (1, 1') sont disposées entre 20 cm et 100 cm, préférentiellement entre 30 cm et 70 cm, sous la couche de surface (5).

7. Structure de route selon l'une quelconque des revendications 2 à 6, **caractérisée en ce que** les plaques (1, 1') des couches superposées sont placées de façon décalée de sorte que les joints entre les plaques (1, 1') ne sont pas alignés entre les différentes couches.

8. Structure de route selon l'une quelconque des revendications précédentes, **caractérisée en ce que**, dans la couche d'isolation, les plaques adjacentes / successives (1, 1') sont fixées les unes aux autres par un assemblage à rainure et languette.

9. Utilisation d'une plaque d'isolation (1, 1') comprenant une couche d'isolation (2) faite d'une matière plastique cellulaire qui est du polystyrène extrudé, et la première surface plane (3) et la seconde surface plane (4) dont la couche d'isolation comprend une structure de renforcement en natte de fibres de verre résistante aux alcalis qui est fixée à la couche d'isolation (2) avec un matériau de revêtement, tel que du béton, du mortier ou une composition adhésive, dans la structure de route et de sol sous la couche de surface (5).

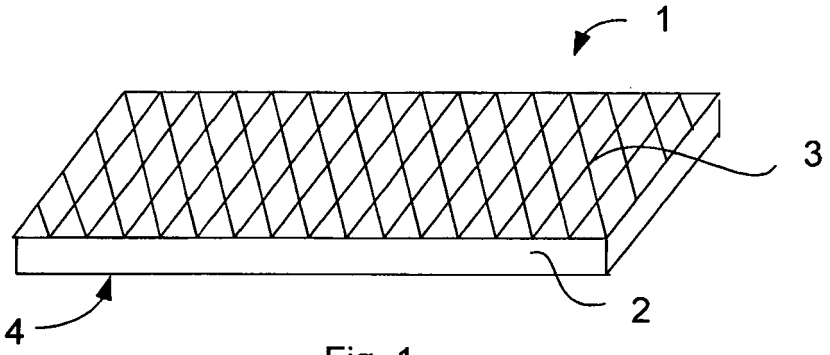

Fig. 1

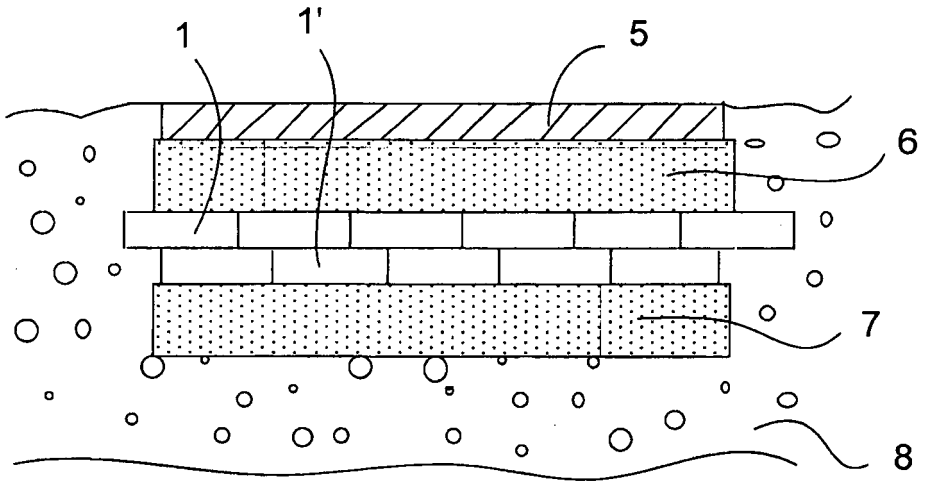

Fig. 2

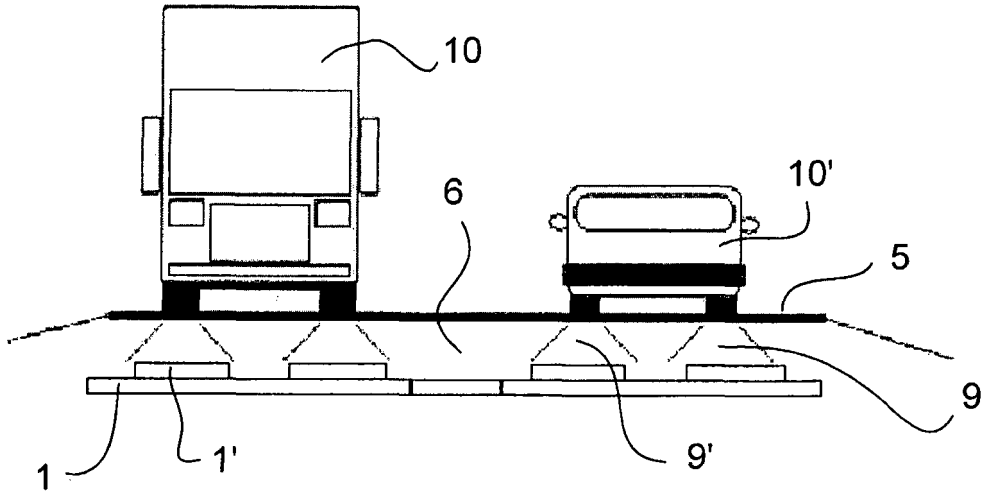

Fig. 3

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- NL 2004245 C **[0002]**
- WO 9743498 A1 **[0002]**
- US 6146054 A **[0002]**