A method of processing artificial turf is disclosed which enables a region of artificial turf or a walled structure to made using the artificial turf. This enables walled structures and other structures to be made using recycled artificial turf.
PROCESSING OF ARTIFICIAL TURF

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims benefit under 35 U.S.C. 119 to Great Britain application No. GB1414012.3, filed in the Great Britain Patent Office on Aug. 7, 2014, which is incorporated by reference herein in its entirety. This application also claims benefit under 35 U.S.C. 119 to Great Britain application No. GB1513807.6, filed in the Great Britain Patent Office on Aug. 4, 2015 which is incorporated by reference herein in its entirety.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention
[0003] The present general inventive relates to the processing of artificial turf and in particularly, but not solely, to the processing of artificial turf for use in forming a wall structure for a golf course bunker or other formation.
[0004] 2. Description of the Related Art
[0005] Artificial turf comprises an upper surface provided within an array of turf fibers of nylon, polypropylene or other synthetic material upstanding from a backing layer of polyurethane, canvas, latex or other sheet material. Generally larger areas of artificial turf are in-filled with sand and/or another granular material to prevent expansion and contraction with temperature and to hold the artificial turf firmly in-situ.
[0006] Artificial turf has a finite lifespan, particularly when it is used as a surface in sports fields. At present, a high proportion of used artificial turf undesirably ends up in landfill sites.
[0007] UK Patent No. GB2490637B discloses how used artificial turf material can be cut into strips or tiles and then used to create a wall structure for a golf course by forming substantially horizontal layers of the material. This use of reclaimed artificial turf not only significantly reduces waste but it creates an extremely hardwearing and aesthetically pleasing side wall for a golf course bunker. The granular infill in the artificial turf actually benefits the structure because it increases the density of the layers and helps to distribute load and helps to keep the layers together.
[0008] An area of artificial turf which is to be removed and reclaimed for re-use is firstly cut into strips whilst in-situ. The strips are then rolled or stacked, removed from site and then taken to storage before being transported to a site for re-use. Unfortunately, this process can cause the granular infill to fall out of the turf fibers, with a result of the large proportion of the artificial turf cannot be re-used in a satisfactory manner.
[0009] What is needed is a method of processing artificial turf which alleviates the above-mentioned problems.

SUMMARY OF THE INVENTION

[0010] It is an aspect of the present invention to provide an improved processing of artificial turf.
[0011] These together with other aspects and advantages which will be subsequently apparent, reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Further features and advantages of the present invention, as well as the structure and operation of various embodiments of the present invention, will become apparent and more readily appreciated from the following description of the preferred embodiments, taken in conjunction with the accompanying drawings of which:
[0013] FIG. 1 is a sectional view through an area of artificial turf which has been treated in accordance with an embodiment;
[0014] FIG. 2a is a sectional view through a walled structure comprising a plurality of layers of artificial turf in accordance with an embodiment; and
[0015] FIG. 2b is a magnified view of region A on FIG. 2a, according to an embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] Reference will now be made in detail to the presently preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout.
[0017] In accordance with the present invention, there is provided a method of processing artificial turf, the method providing an area of artificial turf to be processed, the artificial turf comprising a backing substrate sheet and an upper surface formed by a plurality of artificial fibers upstanding from the backing substrate sheet and a granular infill material disposed between the fibers, wherein the method further comprises applying a binding agent to the upper surface of the turf so as to wet and bind the granular infill.
[0018] The binding agent may be applied at any stage in the method. The binder may, for example, be applied to the upper surface of the turf prior to being reclaimed from a previous environment in which it was used or stored or, alternatively or additionally, the binder may, for example, be applied when the artificial turf is being used to build a walled structure or after such a structure has been constructed.
[0019] Preferably the binding agent is allowed to dry, harden or set prior to moving the artificial turf to another location from that where the binding agent is applied.
[0020] In use, the binding agent bonds the granules of the infill material together so that they cannot fall out as the artificial turf is further processed, transported, stored and re-used.
[0021] Alternatively, the process could be applied to new artificial turf once the upper surface thereof has been in-filled with the granular material.
[0022] The binding agent may be applied by spraying, painting or otherwise wetting the granular infill material.
[0023] The binding agent may comprise an adhesive formed of modified starch, methyl cellulose, polyvinyl acetate (PVA), or other material. The binding agent may also comprise other materials such as, for example, acrylic paint, humectant or a dying agent.
[0024] The use of a humectant in the binding agent has the effect of retaining moisture inside the artificial turf.
[0025] The use of a dying agent in the binding agent enables the application of color to the artificial turf which can help to delineate regions within a structure constructed using the artificial turf. This may enable color to be added to a structure or region constructed using the artificial turf, which may enable an advert or a slogan to be displayed therein. If the
artificial turf is being used to construct a wall structure for a
golf course bunker, the color may be chosen to match that of
sand within the bunker.

[0026] The use of an adhesive means that other material,
such as sand, may be applied to form a surface of that material
on the artificial turf as the presence of the adhesive will cause
the other material to adhere to the artificial turf.

[0027] The formation of a surface of a material such as sand
on the artificial turf hides the material from which the artifi-
cial turf is composed which means that a structure formed
from the artificial turf is less unsightly.

[0028] Preferably the artificial turf is cut into strips or tiles
following application of the binding agent.

[0029] In order to facilitate cutting, the cutting process may be
carried out before the binding agent dries, hardens or sets.

[0030] Also in accordance with the present invention, there is
provided a region of artificial turf comprising a backing sub-
strate sheet and an upper surface formed by a plurality of
artificial fibers upstanding from the backing substrate sheet, a
granular infill material disposed between the fibers and a
binding agent holding the granules of infill material together.

[0031] Also in accordance with the present invention, there is
provided a wall structure formed of a plurality of layers of
the artificial turf as hereinbefore defined.

[0032] An embodiment of the present invention will now be
described by way of example only and with reference to the
accompanying drawings in which:

[0033] FIG. 1 is a sectional view through an area of artificial
turf which has been treated in accordance with an embo-
diment.

[0034] FIG. 2a is a sectional view through a walled struc-
ture comprising a plurality of layers of artificial turf in accord-
ance with an embodiment.

[0035] FIG. 2b is a magnified view of region A on FIG. 2a,
according to an embodiment.

[0036] Referring to FIG. 1, there is shown a region of artifi-
cial turf 10 comprising a flexible substrate sheet 11. The
upper surface of the turf 10 comprises a dense array of
upstanding artificial turf fibers 12, which may be arranged
individually or in groups as shown.

[0037] The space between the fibers 12 is filled with a
granular infill 13. The depth of the infill 13 is arranged as
such that a significant proportion of the upper end of each fiber 12
protrudes out of the infill 13 to form a fibrous surface. In
the example shown, the infill comprises a first layer 13a of sand
and a second layer 13b of rubber crumb material 13b. How-
ever, the infill may comprise only one kind of infill material or
a mixture of infill materials, either mixed together or arranged
in separate layers.

[0038] The artificial turf is hereinbefore defined is widely
used as a covering for sports fields. After a long period of use,
the artificial turf becomes flattened and worn and needs to be
replaced. As hereinbefore described, UK Patent No.
GB2490637B discloses how used artificial turf can be
recycled by cutting it into strips or tiles, which can be laid to
form a side wall of a golf course bunker.

[0039] We now describe, with reference to FIGS. 2a and 2b,
the construction of a golf course bunker 20 as an example of
a walled structure comprising a region of artificial turf 22
comprising layers of artificial turf 24 treated in accordance
with the present invention.

[0040] FIG. 2a illustrates in sectional view the golf course
bunker 20 comprising a wall 30 constructed from layers of
artificial turf 24 treated in accordance with the present inven-
tion and infill material 42. FIG. 2b shows a close-up or
enlarged view of region A of FIG. 2a. It is clear from FIG. 2b
that at least some of the layers of artificial turf 24 are stag-
gered which defines steps 32 between adjacent layers of arti-
ficial turf 24.

[0041] It is desirable that the granular infill 13 remains in
the artificial turf when constructing such wall structures as
wall 30. In order to prevent the infill 13 from falling out of the
spaces between the fibers 12 during removal, transportation,
storage and re-use, the present invention provides for applying
a liquid binding agent 28 to the granular infill 13. This
agent 28 is applied by spraying or otherwise wetting the upper
surface 34 of the artificial turf 10 prior to removal from its
original location where it may be being used for another
purpose, such as to form a sports field, or being stored.

[0042] Alternatively, additionally or optionally, the liquid
binding agent 28 may be applied by spraying or otherwise
wetting the upper surface 34 of the artificial turf 10 as the
layers of artificial turf 24 are being laid upon one another to
cast the wall 30 of golf course bunker 20.

[0043] FIG. 2b exaggerates the scale of the nozzle 26a
which may be used to apply the liquid binding agent 28 for
clarify only.

[0044] The layers of artificial turf 24 may additionally be
tied together using anchor pins 40.

[0045] The binding agent 28 penetrates at least the upper
surface of the infill 13 to hold it together and to keep it in-
situ whilst the material is further processed, transported, stored
and re-used.

[0046] A binding agent 44 may also be applied to the
exposed edge 36 of the artificial turf 10 using a nozzle 26b,
the size of which is also exaggerated in FIG. 2b. Alternatively,
optionally or additionally, the binding agent 44 applied to
the exposed edge 36 may be a different binding agent from the
binding agent 28 applied to the upper surface 34.

[0047] The binding agent 44 may comprise a dyeing agent
which can be used, when the binding agent is applied to the
exposed edge 36, to apply color to the exposed edge 36 of the
artificial turf to alter the appearance of the outer edge 36 of the
layers of artificial turf 24.

[0048] The application of binding agent 28 and/or binding
agent 44 may be repeated to build up a layer of coverage on
the upper surface 34 or the exposed edge 36. After a number
of applications of the binding agent 44 the steps 32 on the
exposed edge 36 may become indiscernible.

[0049] The method of processing artificial turf in this man-
ner significantly improves the quality and quantity of used
artificial turf which is suitable for re-use in forming walled
structures.

[0050] The many features and advantages of the invention
are apparent from the detailed specification and, thus, it is
intended by the appended claims to cover all such features
and advantages of the invention that fall within the true spirit
and scope of the invention. Further, since numerous modifi-
cations and changes will readily occur to those skilled in the
art, it is not desired to limit the invention to the exact con-
struction and operation illustrated and described, and accord-
ingly all suitable modifications and equivalents may be
resorted to, falling within the scope of the invention.

What is claimed is:
1. A method of processing artificial turf, the method com-
prises:

- providing an area of artificial turf to be processed, the
artificial turf comprising a backing substrate sheet and
an upper surface formed by a plurality of artificial fibers upstanding from the backing substrate sheet and a granular infill material disposed between the fibers, wherein the method further comprises applying a binding agent to the upper surface of the turf so as to wet and bind the granular infill.

2. The method of claim 1, wherein in use, the binding agent bonds the granules of the infill material together so that they cannot fall out as the artificial turf is further processed, transported, stored and re-used.

3. The method of claim 1, wherein the method is applied to artificial turf which is going to be re-used by applying the binding agent to the artificial turf prior to removing the artificial turf from its original location.

4. The method of claim 1, wherein the method is applied to the process could be applied to new artificial turf once the upper surface thereof has been in-filled with the granular material.

5. The method of claim 1, wherein the binding agent is applied by spraying the granular infill material.

6. The method of claim 1, wherein the binding agent is applied by painting the granular infill material.

7. The method of claim 1, wherein the binding agent is applied by wetting the granular infill material.

8. The method of claim 1, wherein the binding agent comprises an adhesive formed of modified starch.

9. The method of claim 1, wherein the binding agent comprises an adhesive formed of methyl cellulose.

10. The method of claim 1, wherein the binding agent comprises an adhesive formed of polyvinyl acetate.

11. The method of claim 1, wherein the binding agent comprises acrylic paint.

12. The method of claim 1, wherein the binding agent comprises a humectant.

13. The method of claim 1, wherein the binding agent comprises a dyeing agent.

14. The method of claim 1, wherein the binding agent is allowed to dry, harden or set prior to moving the artificial turf to another location from that where the binding agent is applied.

15. The method of claim 1, wherein the artificial turf is cut into strips or tiles following application of the binding agent.

16. The method of claim 15, wherein the artificial turf is cut before the binding agent dries, hardens or sets.

17. A region of artificial turf comprising:
   a backing substrate sheet;
   an upper surface formed by a plurality of artificial fibers upstanding from the backing substrate sheet;
   a granular infill material disposed between the fibers; and
   a binding agent holding the granules of infill material together.

18. The region of artificial turf as recited in claim 17, further comprising a walled structure comprising the region.

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