The infill ballast can be sand, soil, or a binding infill (such as cementitious materials).

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**Title:** METHOD FOR INSTALLING SYNTHETIC GROUND COVER WITH INFILL

**Abstract:** A synthetic ground cover method includes placing a synthetic grass atop the ground, the synthetic grass including a composite of one or more geo-textiles tufted with synthetic yarns. The synthetic ground cover method also includes applying an infill ballast to the synthetic grass by spreading the infill ballast over and onto the synthetic grass from a moving vehicle. The infill ballast can be sand, soil, or a binding infill (such as cementitious materials).
METHOD FOR INSTALLING SYNTHETIC GROUND COVER WITH INFILL

BACKGROUND

[0001] Artificial grass has been extensively used in sport arenas (playing fields) as well as along airport runways and in general landscaping. A primary consideration of artificial turf playing fields is the ability of the field to drain. Examples of prior art in synthetic grass drainage are U.S. Pat. Nos. 5,876,745; 6,858,272; 6,877,932 and 6,946,181. However, these artificial grasses are generally only suitable for field playing surfaces where the ground is substantially flat and the concern is only with the ability to improve field playing conditions.

SUMMARY OF THE INVENTION

[0002] Briefly described, in an example form, the invention comprises a method of covering ground, such as for erosion control or site closure. The method includes the steps of: (a) placing a synthetic grass atop the ground, the synthetic grass having a backing and synthetic grass blades extending up therefrom; (b) applying an infill ballast to the synthetic grass by mechanically spreading the infill ballast over and onto the synthetic grass. Optionally, the infill can be a binding infill or a non-binding infill. In the case of using a binding infill, the binding infill preferably is applied dry and then a wetting agent is applied to the dry infill to cure the dry infill into a bound infill to stabilize the infill against high velocity water shear forces. Optionally, the dry infill ballast includes cement and the wetting agent comprises water.

[0003] In one preferred form, the infill is sand.

[0004] In one preferred form, the infill is mechanically spread over and onto the synthetic turf by blowing the infill over and onto the synthetic turf. In another example form, the infill is mechanically spread over and onto the synthetic turf by using a high-speed conveyor spreader. In yet another example form, the infill is mechanically spread over and onto the synthetic turf by using a broadcast spreader.

[0005] In another form, the present invention relates to a new and useful system for covering various types of ground. More particularly, in a first example form the
invention comprises a synthetic ground cover system to be placed atop the ground, including a synthetic grass which comprises a composite of one or more geo-textiles tufted with synthetic yarns. The synthetic ground cover also includes an infill ballast applied to the synthetic grass. The synthetic ground cover is applied to the ground and then an infill is blown and/or spread over and onto the synthetic grass. The infill can be a binding infill or can be a non-binding infill. In one preferred form, the infill is a non-binding infill, such as sand, soil, gravel, etc.

[0006] If using a binding infill, cement can be blown over and onto the synthetic grass and then wetted. Alternatively, a pre-wetted cement can be blown and onto the synthetic grass. Optionally, the binding agent in the synthetic ground cover system for erosion control is cement, grout, lime or the like. Optionally, the binding agent can comprise a polymer. Preferably, the binding agent applied to the infill results in a bound infill having a depth of between about ¼ inch and about 2 inches. Also, preferably the infill is applied to the synthetic grass in a dry condition. In the case of a binding infill, it optionally is wetted later to be cured into a bound infill. Preferably, the infill comprises a sand or granular material and the binding agent comprises cement. Preferably, the sand-to-cement ratio is between about 1:1 and 3:1 by weight.

[0007] Optionally, the synthetic ground cover also includes at least one filter fabric to be placed on or in the ground and an open grid mesh positioned between the synthetic grass and the filter fabric. Preferably, the at least one filter fabric comprises non-woven synthetic fabric. Also preferably, the open grid mesh comprises a synthetic drainage system. Optionally, the synthetic ground cover can include at least one low permeability barrier geomembrane to be placed adjacent the ground.

[0008] Optionally, the synthetic grass has a density of between about 20 ounces per square yard and 120 ounces per square yard. Preferably, the synthetic grass has fibers with an average length of between about 0.5 and 4 inches that act as reinforcement for the sand/soil infill. Optionally, the synthetic grass has fibers with an average length of between about 1.5 and 3 inches.

[0009] Preferably, the filter fabric is positioned to be in direct contact with the ground surface and comprises woven synthetic fabric. Alternatively, the synthetic fabric
can be a non-woven material.

[0010] It is to be understood that this invention is not limited to the specific devices, methods, conditions, or parameters described and/or shown herein, and that the terminology used herein is for the purpose of describing particular embodiments by way of example only. Thus, the terminology is intended to be broadly construed and is not intended to be limiting of the claimed invention. For example, as used in the specification including the appended claims, the singular forms "a," "an," and "one" include the plural, the term "or" means "and/or," and reference to a particular numerical value includes at least that particular value, unless the context clearly dictates otherwise. In addition, any methods described herein are not intended to be limited to the sequence of steps described but can be carried out in other sequences, unless expressly stated otherwise herein.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

[0011] FIGURE 1 is a schematic, sectional view of a synthetic ground cover system according to a first example of the present invention.

[0012] FIGURE 2 is a schematic, sectional view of a synthetic ground cover system according to another example of the present invention, shown with an open mesh grid drainage at the bottom of the system.

[0013] FIGURE 3A is a schematic, sectional view of a synthetic ground cover system according to another example of the present invention.

[0014] FIGURE 3B is a schematic, detailed sectional view of the synthetic ground cover system of FIGURE 3A.

[0015] FIGURE 4 is a schematic, sectional view of a synthetic ground cover system according to another example of the present invention.

[0016] FIGURE 5A is a schematic, sectional view of the synthetic ground cover system of FIGURE 1 and shown installed over terrain of various slopes.

[0017] FIGURE 5B is a schematic, detailed sectional view of the synthetic ground cover system of FIGURE 5A.
[0018] FIGURE 6 is a schematic side view of a spreader vehicle for spreading infill according to a preferred method of the present invention.

[0019] FIGURE 7 is a schematic perspective view of the spreader vehicle of FIGURE 6.

[0020] FIGURES 8A and 8B are schematic views of a portion of the spreader vehicle of FIGURE 6.

[0021] FIGURE 9 is a schematic perspective view of the spreader vehicle of FIGURE 6 shown spreading infill over and onto synthetic turf.

[0022] FIGURE 10 is a schematic perspective view of a high-speed conveyor spreader vehicle for blowing/spreading infill according to another preferred method of the present invention.

[0023] FIGURE 11 is a schematic perspective view of the spreader vehicle of FIGURE 10 shown with the placing conveyor in the lowered/retracted position and being carried on a utility trailer by a vehicle.

DETAILED DESCRIPTION

[0024] The present invention provides an erosion protection layer for use in embankments, ditches, levees, water channels, downchutes, landfills and other steep topographic ground conditions that are exposed to shear forces of water and winds. The present invention can also be utilized in a wide variety of situations in which a ground closure is needed.

[0025] In a first example form, the invention comprises a method of covering ground, such as for erosion control or site closure. The method includes the steps of: (a) placing a synthetic grass atop the ground, the synthetic grass having a backing and synthetic grass blades extending up therefrom; (b) applying an infill ballast to the synthetic grass by blowing the infill ballast over and onto the synthetic grass. In one preferred form, the infill is sand. Optionally, the dry infill ballast can include soil.

[0026] In other embodiments, the dry infill ballast includes cement. The infill can be organic or inorganic.
[0027] Preferably, the infill is applied in a dry state. Optionally, the infill can be wetted prior to being applied.

[0028] In a preferred example form, the infill is blown over and onto the synthetic turf from a moving vehicle.

[0029] Optionally, the infill can be a binding infill or a non-binding infill. In the case of using a binding infill, the binding infill preferably is applied dry and then a wetting agent is applied to the dry infill to cure the dry infill into a bound infill to stabilize the infill against high velocity water shear forces. Optionally, the dry infill ballast includes cement and the wetting agent comprises water.

[0030] Optionally, the present invention can be used with a synthetic grass as described next, although those skilled in the art will appreciate that other types of synthetic grass can be employed as well. In this example, the synthetic grass used can be provided with a bound/stabilized infill ballast to provide a new and useful ground cover system, while also providing a beneficial erosion protection system that does not require maintenance. This combination (sometimes referred to as a composite material) can be used for covering slopes and lining drainage ditches, swales, and downchutes. With the cover system of this invention, owners and operators can realize significant cost savings by constructing a cover system with synthetic grass that does not require the vegetative support and does not require a topsoil layer typical of the known prior art final cover systems.

[0031] **FIGURE 1** is a schematic, sectional view of an example synthetic ground cover system 110 for erosion control according the present invention and showing the surface of the soil S covered with the present ground cover erosion control system. The system includes a synthetic turf 140 which includes a backing 142 and synthetic turf blades 141 secured to the backing. A stabilized/bound sand/soil infill 160 is blown over and into the bottom of the synthetic turf 140 above the backing 142. The soil S can be topped with a sand subgrade, gravel subgrade, or intermediate cover before laying down the synthetic ground cover system 110 for erosion control, as desired. In this first example embodiment, the synthetic turf 140 is placed more or less directly atop the soil S. As will be seen below, the system can also be provided with additional elements.
interposed between the soil S and the turf 140. As described above, the sand/soil infill 160 is blown into the bottom of the synthetic turf 140 by blowing the sand/soil infill 160 over and onto the synthetic turf 140 from a vehicle equipped with a suitable blower apparatus.

[0032] In one example form of the turf that can be used with the blown infill, the synthetic turf 140 is constructed using a knitting machine or tufting machine that may use, for example, over 1,000 needles to produce a turf width of about 15 feet. Preferably, the synthetic turf includes synthetic grass blades 141 which comprise polyethylene monofilament and/or slit-film fibrillated and non-fibrillated fibers tufted to have a blade length of between about 0.5 inches and 4 inches. Other polymers can be used for the synthetic grass blades, as desired. Preferably, the synthetic grass blades 141 are tufted to have a blade length of between about 1.5 inches and 3 inches. Most preferably, the synthetic grass blades 141 are tufted to have a blade length of about 1.5 inches. Optionally, the synthetic grass blades 141 are tufted to have a density of between about 20 ounces/square yard and about 120-ounces/square yard. Preferably, the synthetic grass blades have a thickness of at least about 100 microns. Those skilled in the art will recognize that synthetic turfs having different characteristics can be used with the present invention as well.

[0033] The synthetic grass blades 141 are tufted into the substrate or backing 142 comprising a synthetic woven or non-woven fabric. Moreover, this backing can be a single ply backing or can be a multi-ply backing, as desired. Optionally, a geo filter can be secured to the substrate to reinforce the substrate and better secure the synthetic grass blades.

[0034] The chemical composition of the synthetic turf components can be selected to resist degradation by exposure to sunlight, which generates heat and contains ultraviolet radiation. The polymer yarns should not become brittle when subjected to low temperatures. The selection of the synthetic grass color and texture should be aesthetically pleasing.

[0035] In one example form, the actual grass-like components preferably consist of green polyethylene fibers 141 of about 1.5 to about 2.5 inches in length tufted into a
woven or non-woven geotextile(s). For added strength in severely steep sideslopes, an additional geo filter component backing can be tufted for improving dimensional stability. The polyethylene grass filaments 141 preferably have an extended operational life of at least 15 years.

[0036] A sand/soil layer 160 of about 0.5 to about 2.0 inches is spread atop the synthetic turf as infill to ballast the material and protect the system against wind uplift as well as to provide dimensional stability. Preferably, the infill is between about 0.5 and 1 inches. The sand/soil layer provides additional protection of the geotextiles against ultraviolet light. Moreover, the sand/soil ballast is bonded with cement, grout, lime or another binding agent in order to resist the shear forces of water and wind on steep sideslopes, drainage ditches and downchutes. In this regard, the synthetic turf 140 is first placed over the ground and then the sand/soil infill is spread over the synthetic turf in dry form. This allows the dry infill material to easily and effectively settle into the bottom of the synthetic turf. Thereafter, the infill is watered (as by spraying water over the turf) and allowed to cure into a hardened, bound infill layer. In this regard, the sand/soil infill is bound to itself and is bound to the individual blades of the synthetic turf. Thus, in the event that the bound infill should become cracked in places, the individual blades of the turf act as anchors and help hold the bound infill in place.

[0037] The "sand/soil" infill includes true sands (including silica sands, quartz sands, etc), soils, clays, mixtures thereof, etc. It also includes things that are like sand or soil. For example, granular tailings from rock quarries could be employed (things like granular marble, quartz, granite, etc). Also, small gravel can be used as the "sand/soil" infill. In this regard, it is preferred that the infill be inorganic in nature so as to be very stable and long-lasting. But organic granular material could be employed in certain applications.

[0038] Optionally, the infill can be stabilized with a binding agent in certain applications. Such a binding agent could be inorganic or organic. Preferably, the binding agent is inorganic (again, for stability and long life). The cements, grouts, liming agents, etc., fit this application well. But other binding agents, such as organic binders, could be employed. For example, polymer-based binders could be used (for example, a
urethane product). Indeed, in recent times a spray-on binding agent has come to market for binding small gravel in pathways under the brand name "Klingstone" and sold by Klingstone, Inc. of Waynesville, NC.

[0039] Applicants have found that a recipe of about three parts sand and one part cement works well as a dry infill. Once wetted and cured, this bound sand infill provides an excellent ballast against lifting of the turf by wind and also resists damage or erosion from wind or rain or high water flows. A recipe of about equal parts sand and cement also works well, as do ratios between these two examples. However, for economic reasons, one should choose to use only as much cement as is needed to hold the infill together and to the synthetic turf blades, as cement is more costly than sand (generally). Thus, recipes closer to 3:1 are generally more economical but have lower strength, while recipes closer to 1:1 are generally stronger, but more expensive. Moreover, a recipe of 2:2:1 of sand/cement/lime works well also. Also, instead of lime one can use fly ash.

[0040] Advantageously, the present invention can be used even where high concentrated flows are expected (e.g., downchutes, large drainage swales). To this end the sand/soil infill is stabilized with a binding agent, such as cement, grout, lime, etc. This creates a more or less grouted or bound sand/soil infill 160 to resist the shear forces of water flow and wind.

[0041] This invention combines the use of a synthetic grass to provide a pleasant visual appearance, erosion protection with very minimal maintenance. The invention incorporates a bound infill that, together with the synthetic grass, can handle very rapid water run-offs. Thus, the cover system of this invention can be installed on very steep slopes which typically occur in embankments, levees, dams, downchutes, landfills and stockpiles. The system can be used as erosion control material that can resist large shear forces of water or wind.

[0042] In addition to the embodiments described above, the system can take other forms. For example, the system can comprise a membrane with a drainage layer overlain by synthetic turf having cemented (stabilized) infill using any of the binding agents described herein and the like. In such an embodiment, a bottom layer includes a
structured low permeable membrane (optionally with textured or spikes on bottom side and drainage studs on top side) and a top layer. The top layer can include turf (with, for example, 1.5 inch pile height) and an infill of sand, lime and cement mixture. In one example, the infill can be 0.75 inches of the mixture.

[0043] **FIGURE 2** is a schematic, sectional view of another example synthetic ground cover system 210 for according to the present invention, shown without an open mesh grid at the bottom of the system. Similarly to the example embodiment of **FIGURE 1**, the example cover system 210 for erosion control shown in **FIGURE 2** is used to control erosion of the soil S. The system 210 includes a lower filter fabric (geofilter) 220, an open grid mesh or geo-net 230 and a synthetic turf 240. The synthetic turf 240 includes a backing 242 and blades 241 secured to the backing. A stabilized/bound sand/soil infill 260 is blown over and into the bottom of the synthetic turf 240 above the backing 242. The soil S can be topped with a sand subgrade, gravel subgrade, or intermediate cover before laying down the synthetic ground cover system 210 for erosion control, as desired. Preferably, the lower filter fabric 220 comprises a woven or non-woven synthetic fabric. In some applications, the lower filter fabric 220 can be replaced with a barrier geomembrane with low permeability.

[0044] **FIGURES 3A and 3B** depict a synthetic ground cover system 310 according to a third example of the present invention, shown without an open mesh grid at the bottom of the system. Similarly to the example embodiment of **FIGURE 1**, the example cover system 310 for erosion control shown in these figures is used to control erosion of the soil S. The system 310 includes an impermeable geomembrane 350 and a synthetic turf 340. The impermeable geomembrane 350 is a polymeric sheet with slender spikes on the bottom surface and cleat-like or stud-like nubs on the top surface. For example, see upper nubs 351-354 and spikes 357-359. The lower spikes help anchor the impermeable geomembrane to the soil S and the upper nubs help anchor the synthetic turf 340 to the impermeable geomembrane 350. The upper nubs also provide a transmissive drainage layer or space in which water can flow over the membrane beneath the synthetic turf. The synthetic turf 340 includes a backing 342 and blades 341 secured to the backing. A stabilized/bound sand/soil infill 360 is blown over and into the bottom of the synthetic turf 340 above the backing 342.
[0045] FIGURE 4 is a schematic, sectional view of another synthetic ground cover system 410 according to the present invention, shown with a reinforcement layer on the backing of the synthetic turf. Similarly to the example embodiment of FIGURE 1, the example cover system 410 for erosion control shown in FIGURE 4 is used to control erosion of the soil \( S \). The system 410 includes a synthetic turf 440 which includes a backing 442 and blades 441 secured to the backing. The backing 442 can be a single ply backing or a multi-ply backing. A urethane barrier 443 is applied to the underside of the backing 442 and acts to both strengthen the backing and the connection between the blades 441 and the backing 442. The urethane barrier 443 also makes the backing 442 generally impermeable to water. A stabilized/bound sand/soil infill 460 is blown over and into the bottom of the synthetic turf 440 above the backing 442.

[0046] FIGURES 5A and 5B show the example embodiment of FIGURE 1 applied over a terrain of varying slopes. This synthetic ground cover system 110 has the capacity to handle high-intensity precipitation and avoids erosion of the sand/soil infill ballast and/or the shearing stresses on the turf ranging from 1 pound per square foot to more than 25 pounds per square foot.

[0047] The applicants have found that sand works particularly well as the primary ballast agent, although soil works well as well. Even small gravel could be employed as the primary ballast agent. Moreover, the applicants have found that the binding agent that works the best in most applications is cement, although other binding agents could work very also. Thus, while cementitious materials are the preferred binders, other materials could work also.

[0048] As mentioned above, preferably the infill is mechanically spread over and onto the synthetic turf using a machine. In a preferred embodiment, the machine is a vehicle with a material hopper for containing a quantity of the infill and spreading it. The spreading machine can take various forms.
One type of suitable spreading machine uses a high-speed conveyor for conveying material from a hopper out and onto and area to receive the material. FIGURE 6 is a schematic side view of a high-speed conveyor spreader vehicle for blowing/spreading infill according to a preferred method of the present invention. Such a conveyor spreading machine is available commercially from various sources, including Conveyor Application Systems, LLC of Eugene, Oregon. As shown in FIGURE 6, the spreading machine is in the form of a truck 600 having a cab 610 and a bed 620 with a hopper and conveyor system. A feed conveyor delivers loose material from the hopper to a placing conveyor 630 (shown in both a raised and lowered positions here in FIGURE 6). The placing conveyor 630 includes a long boom 640, which in this example supports an exemplary 14’ long belt (measured lengthwise in one direction). The boom 640 can be pivoted up and down and side to side, across wide angles, such that the boom 640 and the conveyor 630 can be aimed in a variety of directions and operated to deliver the loose material at various distances. Such a machine 600 can deliver and spread a wide variety of materials.

FIGURE 7 is a schematic perspective view of the spreader vehicle 600 of FIGURE 6 showing the cab 610 and the bed 620 with internal hopper.

FIGURES 8A and 8B are schematic views of a portion of the spreader vehicle of FIGURE 6. In FIGURE 8A, the boom 640 is shown supporting the placing conveyor 630 and operated to deliver the loose material M along a particular path and over a considerable distance from the vehicle. As can be seen in FIGURE 8B, the boom 640 is generally V-shaped in cross-section and the conveyor belt portion of the placing conveyor 630 tends to conform to the V-shaped cross-section. This helps to hold the conveyed material within the placing conveyor as the placing conveyor rapidly conveys the loose material. Thus, even though the loose material is being accelerated rapidly and jostled about a bit, it tends to stay put within the placing conveyor until it is ejected therefrom at the end of the placing conveyor’s belt.

FIGURE 9 is a schematic perspective view of the spreader vehicle 600 of FIGURE 6 shown spreading/blowing infill material M over and onto synthetic turf.
Another type of suitable spreading machine uses a high-speed conveyor for conveying material from a hopper out and onto an area to receive the material. **FIGURE 10** is a schematic perspective view of a high-speed conveyor spreader vehicle for blowing/spreading infill according to another preferred method of the present invention. Such a conveyor spreading machine is available commercially from various sources, including Conveyor Application Systems, LLC of Eugene, Oregon. As shown in **FIGURE 10**, the spreading machine is in the form of an off-road, radio-controlled vehicle 700 having a bed 720 with a hopper and conveyor system. A feed conveyor delivers loose material from the hopper to a placing conveyor 730 (shown in a raised/extended position in **FIGURE 10** and a lowered/retracted position in **FIGURE 11**). The placing conveyor 730 includes a long boom 740, which in this example supports an exemplary 14' long belt (measured lengthwise in one direction). The boom 740 can be pivoted up and down and side to side, across wide angles, such that the boom 740 and the conveyor 730 can be aimed in a variety of directions and operated to deliver the loose material at various distances. Such a machine 700 can deliver and spread a wide variety of materials. The off-road, radio-controlled vehicle 700 can be operated with a remote control, and can be stationary or moving when delivering and spreading the loose material.

**FIGURE 11** is a schematic perspective view of the spreader vehicle 700 of **FIGURE 10** shown with the placing conveyor 730 in the lowered/retracted position and being carried on a utility trailer T by a vehicle V.

In another preferred form, the spreading machine can be a blowing machine that uses high volume air flow to entrain the infill and project it out over and onto the synthetic turf. Such a pneumatic blowing machine is available commercially from various sources, including Express Blower, Inc. of Eugene, Oregon. Such a machine typically utilizes air blown at high speed, at high volume or at high pressure to entrain loose material into an air/material stream and project that air/material stream out over a distance. Optionally, one can utilize a combination of high pressure and air volume.
Those skilled in the art will recognize that there are various techniques for mechanically spreading the infill material out and over the synthetic turf. For example, as described above, the infill can be spread by blowing the same over the synthetic turf. Alternatively, the infill can be spread by high-speed conveyance. Also, the infill can be spread by a broadcast spreader (such as with a rotary impeller) or a drop spreader.

In one preferred form, the infill material comprises a sand layer of about ½-inch thick (nominal). The sand is worked into the synthetic turf layer as infill between the synthetic yarn blades. The physical characteristics of the sand layer can be evaluated through visual observation (and laboratory testing if deemed necessary) before construction and visual observation during construction.

The sand layer should only receive minimal compaction required for stability. No equipment should be allowed on slopes exceeding 15% until the sand infill is in place. In flatter slopes, such as top decks, ATV's and vehicles will be allowed prior to infill placement if the tire pressure is less than 15 psi.

As described above, conveyor trucks and/or blower trucks can be used to spread and place the sand infill. For slopes 3H:1 V or steeper the sand infill preferably should be placed using long-reach conveyors belts or using water or air express blower methods.

The sand and/or sand aggregate optionally can consist of highly permeable sand with an SW or SP curve specification. The curve can indicate the material consisting of medium sand having approximately 10% coarse and 10% fine sand.

The minimum initial lift of sand infill will be determined based on the type of placement equipment, and the slope and geometry considerations of the slope. An average of 0.5 to 0.75 inches is recommended for equipment with light ground pressure of less than 30 psi.

Preferably, the sand placement can be done in front of the spreading equipment to improve the load-bearing capacity of the cover system below.

An average thickness of ½ inch of sand infill can be applied before
allowing lightweight vehicles on the turf. This is particularly important on slopes steeper than 3H to 1V where light rubber or tracked vehicles could start pulling on the turf before the sand infill is in place.

[0064] Note that sand placement should not occur with snow or ice on the synthetic turf. The inventors have found, however, that rain or wet conditions do not hamper the placement of sand (ballast) onto the turf. However wet sand or wet turf conditions severely hinder one's ability to broom the sand in. The sand will dry very quickly when spread evenly and when exposed to atmospheric conditions conducive to drying the material. The sand can then be broomed into the turf, if desired.

[0065] There are many advantages to the cover system of this invention. The cover system reduces construction costs, reduces annual operation and maintenance costs while providing superior and reliable/consistent aesthetics. It also reduces the need for expensive riprap channels and drainage benches, with substantially no erosion or siltation problems, even during severe weather. It is a good choice in sensitive areas where soil erosion and sedimentation are major concerns because soil loss is substantially reduced. It also eliminates the need for siltation ponds and associated environmental construction impacts. It allows for steeper slopes, because there will be a reduced risk of soil stability problems.

[0066] While the invention has been shown and described in exemplary forms, it will be apparent to those skilled in the art that many modifications, additions, and deletions can be made therein without departing from the spirit and scope of the invention as defined by the following claims.
What is claimed is:

1. A method of covering ground for erosion control and/or site closure, the method comprising the steps of:
   - placing a synthetic grass atop the ground, the synthetic grass having a backing and synthetic grass blades extending therefrom; and
   - applying a dry infill ballast to the synthetic grass by mechanically spreading the dry infill ballast onto the synthetic grass.

2. A method as claimed in Claim 1 wherein the dry infill ballast is spread from a vehicle over and onto the synthetic grass.

3. A method as claimed in Claim 2 wherein the dry infill ballast is blown from the vehicle over and onto the synthetic grass.

4. A method as claimed in Claim 2 wherein the dry infill ballast is conveyed from the vehicle over and onto the synthetic grass using a high-speed conveyor.

5. A method as claimed in Claim 2 wherein the dry infill ballast is broadcast from the vehicle over and onto the synthetic grass.

6. A method as claimed in Claim 1 wherein the dry infill ballast includes sand.

7. A method as claimed in Claim 1 wherein the dry infill ballast includes soil.
8. A method as claimed in Claim 1 wherein the dry infill ballast includes cement.

9. A method as claimed in Claim 1 wherein the dry infill ballast is organic.

10. A method as claimed in Claim 1 wherein the dry infill ballast is inorganic.

11. A synthetic ground cover system to be placed atop the ground, comprising:
    a synthetic grass having a backing and synthetic grass blade-like elements
    secured thereto and extending therefrom; and
    an infill ballast applied to the synthetic grass atop the backing, the infill ballast
    applied by mechanically spreading the ballast over and onto the synthetic grass.

12. A synthetic ground cover system as claimed in Claim 11 wherein the dry infill
    ballast includes sand.

13. A synthetic ground cover system as claimed in Claim 11 wherein the dry infill
    ballast includes soil.

14. A synthetic ground cover system as claimed in Claim 11 wherein the dry infill
    ballast includes cement.

15. A synthetic ground cover system as claimed in Claim 11 wherein the dry infill
    ballast is inorganic.

16. A synthetic ground cover system as claimed in Claim 11 wherein the dry infill
    ballast is organic.
17. A synthetic ground cover system as claimed in Claim 11 wherein the dry infill ballast is spread from a moving vehicle over and onto the synthetic grass.

18. A synthetic ground cover system as claimed in Claim 17 wherein the dry infill ballast is blown from a moving vehicle over and onto the synthetic grass.

19. A synthetic ground cover system as claimed in Claim 11 wherein the binding agent is applied as an emulsion in water.

20. A synthetic ground cover system as claimed in Claim 11 wherein the binding agent comprises lime.

21. A synthetic ground cover system as claimed in Claim 11 further comprising at least one filter fabric positioned below the synthetic grass.

22. A synthetic ground cover system as claimed in Claim 11 wherein the binding agent comprises a cementitious material which is subsequently cured with water.

23. A synthetic ground cover system as claimed in Claim 11 wherein the infill is filled to a depth of between about ½ inch and about 2 inches.
# INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/021 189

**A. CLASSIFICATION OF SUBJECT MATTER**

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<tr>
<th>IPC(8)</th>
<th>USPC - 428/1 7</th>
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**According to International Patent Classification (IPC) or to both national classification and IPC**

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC(8) - B09B 1/00; E01C 13/08, E01C 19/18, 19/20; E02D 17/20 (2014.01)

USPC - 404/108; 405/302.6, 258.1; 428/17

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

CPC - B29C 47/00, 49/06; B32B 5/028, 5/26; B09C 1/005; E01C 13/08, 19/18; E02D 17/20, E02D 17/202 (2014.02)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Orbit, Google Patents

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<td>A</td>
<td>US 4,655,635 A (FURUKAWA) 07 April 1987 (07.04.1987) entire document</td>
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Further documents are listed in the continuation of Box C.

* Special categories of cited documents:
  - "A" document defining the general state of the art which is not considered to be of particular relevance
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**Date of the actual completion of the international search**

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