ABSTRACT

A walkway path is produced by a process that includes positioning a plurality of form members over a roofing membrane assembly to define an interior area. A curable composition is applied over the roofing membrane assembly and within the interior area. The curable composition cures to form a seamless protective layer providing a walkway path over the membrane assembly. A non-slip particulate may be spread over the curable composition while it is not yet completely cured.
POUR IN PLACE WALKWAY PAD

[0001] This application claims priority from U.S. Provisional Patent Application Ser. No. 61/441,366 filed on Feb. 10, 2011, which is incorporated herein by reference in its entirety.

FIELD OF THE INVENTION

[0002] One or more embodiments of the present invention are directed toward a method of forming a walkway pad on a roof surface, more particularly, one or more embodiments of the present invention are directed toward a method of forming a walkway pad by applying a liquid protective composition over a membrane assembly on a roof surface.

BACKGROUND OF THE INVENTION

[0003] Large, flexible sheets or membranes are often used in the construction industry as roofing material. These sheets are typically delivered to a construction site in a bundled roll, transferred to the roof, and then unrolled and laid flat. The sheets are then affixed to the building structure by employing varying techniques such as mechanical fastening, ballasting, and/or adhesives to secure the membrane to the roof deck or insulation layer. In order to achieve the necessary water repellent properties, the sheets are positioned so that the edges of adjoining sheets overlap to form lap seams. The overlapping portions of adjacent membranes are secured to one another through a number of methods depending upon the membrane materials and exterior conditions.

[0004] While roofing membranes are capable of withstanding some traffic, it is customary to apply walkway pads over the roofing surface in high traffic areas. Many types and varieties of walkway pads are known in the art. Certain walkway pads are adhered to a roofing membrane with the use of liquid adhesives or tape adhesives that are applied to the walkway pad in the field prior to installing the walkway pad on the roof surface. Other known walkway pads include a pre-applied adhesive tape on a bottom surface of the walkway pad, thereby eliminating several steps during installation.

[0005] Conventional walkway pads are arranged on the roof surface end to end or side by side to define a traffic path across the roof surface. Because the walkway pads are pre-manufactured, there is little flexibility for providing an exact shape or pattern with the walkway pads. Furthermore, time and labor is required to install the walkway pads on a roof surface even where a pre-applied adhesive is provided, which adds to the costs associated with the roofing system. Furthermore, seams are produced between adjacent walkway pads installed on a roof surface, thereby providing a potential point of water infiltration between the walkway pads, which could lead to a need for future replacement or repair work if the walkway pads of the adhesive securing the walkway pads to the roofing membrane are damaged in any way.

[0006] Thus, there is a need for an improved walkway path on a roof surface and method of producing the walkway path that alleviates one or more of the disadvantages discussed above.

SUMMARY OF THE INVENTION

[0007] One or more embodiments of the present invention provide a walkway path produced by a method comprising the steps of: positioning a form member over a roofing membrane assembly to define an interior area; applying a curable composition over the roofing membrane assembly within the interior area; and allowing the protective composition to cure to form a protective layer.

[0008] A method of producing a walkway path over a roofing membrane assembly comprising the steps of: defining outer edges of the walkway path by positioning at least one form member on the membrane assembly; applying a curable composition over the roofing membrane assembly and within an area defined by the at least one form member and allowing the curable composition to cure, thereby forming a protective layer over the membrane assembly and within the at least one form member.

[0009] One or more embodiments of the present invention also provides a kit comprising: a plurality of form members; a fluid composition for forming a protective layer over a surface; and an anti-slip particulate.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1 is a schematic view of a portion of a roof system including a walkway path made in accordance with the present invention;

[0011] FIG. 2 is a sectional view taken substantially along line 2-2 of FIG. 1.

DETAILED DESCRIPTION OF THE ILLUSTRATIVE EMBODIMENTS

[0012] Referring now to FIG. 1, a walkway path according to the concepts of the present invention is shown, and is indicated generally by the numeral 10. Walkway path 10 is installed over a roofing membrane assembly 12 positioned over a roof substrate 14 (FIG. 2). An insulation layer 16 may optionally be provided between roof substrate 14 and membrane assembly 12 (FIG. 2).

[0013] Membrane assembly 12 includes at least one roofing membrane 18 that may be waterproof and weather-resistant. In the embodiment depicted in FIG. 1, three membranes 18a, 18b and 18c are shown. In one or more embodiments, the membranes 18a, 18b and 18c may be fabricated from a thermosetting material. In other embodiments, the membranes 18a, 18b and 18c may be fabricated from a thermofomable material. In one or more embodiments, the membranes may be EPDM based. In other embodiments, the membranes may be TPO based. In these or other embodiments, the membranes may be flexible and capable of being rolled up for shipment. In one or more embodiments, the membranes may include a fabric reinforcement. Membranes suitable for use in membrane assembly 12 are well known in the art, and the particular membrane used should not be viewed as limiting the scope of the present invention.

[0014] The adjacent edges of membranes 18a, 18b and 18c are joined at lap seams, generally indicated by the numerals 20a and 20b. Lap seams 20a and 20b adjoin adjacent edges of the membranes to form a continuous water-tight seal. The lap seams 20a and 20b may be formed by any method known to those skilled in the art for adjoining overlapping membranes. In one or more embodiments, lap seams 20a and 20b may be created using a solvent based primer and adhesive applied to the adjacent edges of the membranes 18a, 18b and 18c. In other embodiments, lap seams 20a and 20b may be created using a primer and a solid adhesive tape applied to the adjacent edges of the membranes 18a, 18b and 18c. In still other embodiments, lap seams 20a and 20b may be created using a...
A unit of roof mounted equipment may be provided upon the roof, such as an air conditioning apparatus in an embodiment. While an air conditioning apparatus is referenced herein, it will be appreciated by those skilled in the art that any type of roof mounted equipment may be provided on the roof, and may require a walkway path to facilitate access to the equipment without damaging the membrane assembly. A walkway path provides an access route from an access point (not shown) on the roof to the equipment. The width, length and shape of walkway path may vary depending upon the size of the roof surface, the foreseeable traffic to the equipment, the location of equipment, the location of the access point, and other circumstances affecting travel across membrane assembly.

Walkway path is created by first providing a plurality of form members. Form members are positioned on membrane assembly to define the edges of walkway path. Form members may be provided in any variety of sizes, shapes and materials suitable for the intended purpose. In one or more embodiments, form members are generally linear in shape. In other embodiments, form members may have curved profiles. In certain embodiments, form members may be made of wood, metal, plastics, or other composite materials. Form members may be secured to adjacent form members at the ends thereof by any method or mechanism known to those skilled in the art. For example, adjacent form members may be secured to one another by fasteners, by adhesives, or by clamping mechanisms. Alternatively, the form members may be secured in place on membrane assembly by ballasts or weights, and may be positioned so that adjacent ends are in contact with one another.

After form members have been positioned on membrane assembly to define the outer edges of walkway path, a liquid protective composition is applied over membrane assembly within the area defined by form members to form a protective layer. The liquid protective composition may be applied over membrane assembly by any method known to those skilled in the art. In one or more embodiments, the liquid protective composition is poured within the area defined by form members to form protective layer. In other embodiments, the protective composition may be applied in liquid form using a spray gun or roller. In certain embodiments, the liquid protective composition may be applied using several successive coats to form a protective layer. In other embodiments, a single coating of the protective composition will be provided to form protective layer.

One or more embodiments, the liquid protective composition may include a polyurethane and/or polyisocyanurate, which, for purposes of this application, may be collectively referred to as polyurethanes. The polyurethanes may derive from a one part polyurethane system, or may derive from a two-part polyurethane system. Useful polyurethanes include those known in the art, including those disclosed in U.S. Pat. Nos. 7,205,347; 3,965,051; 4,025,466; 4,981,880; 5,175,228; 5,905,151; and 5,985,981, which are incorporated herein by reference for the purpose of teaching polyurethanes. As is known in the art, one-part polyurethane compositions include isocyanates and/or polyisocyanates, and rely on moisture within the air to achieve a cure. Also, two-part polyurethanes generally include a first part that includes an isocyanate and/or polyisocyanate, and a second part that is reactive with the isocyanate and/or polyisocyanate; exemplary reactive compounds include polyols.

Polyurethanes have a number of advantageous properties for use in conjunction with walkway paths as contemplated by the invention. Polyurethanes are abrasion and impact resistant and have good capacity for load bearing and flexing. Polyurethanes also have good bonding properties, which are desirable for affixing the composition to the roofing membranes and/or other building materials. As is known in the art, one-part polyurethanes include isocyanates and/or polyisocyanates, and rely on moisture within the air to achieve a cure. Also, two-part polyurethanes generally include a first part that includes an isocyanate and/or polyisocyanate, and a second part that is reactive with the isocyanate and/or polyisocyanate; exemplary reactive compounds include polyols.

In one or more embodiments, non-slip particulate may be spread over protective layer while the protective layer is still in a liquid or partially cured form. In other words, the non-slip particulate may be spread over protective layer before protective layer has cured completely. The particulate is adhesively attached or secured to protective layer by the adhesive or binding properties of the protective composition. In one or more embodiments, the particulate is embedded within and substantially surrounded by the protective layer. In other embodiments, the particulate is secured or adhered to the top surface of protective layer and is not surrounded by the protective layer.

The term particulate, as used herein, should be interpreted in its broadest sense, and should be read to include any solid matter in particle or granular form. In one or more embodiments, the particulate includes a material capable of providing a textured surface to at least a portion of the surface of walkway path. This surface may advantageously protect membrane assembly from traffic over the roof. This surface may also advantageously protect the membrane assembly from punctures, tears or cuts. In one or more embodiments, the particulate may include sand, rock, gravel, crushed gravel, crushed stone, soil or a combination of two or more thereof.

In one or more embodiments, the particulate includes a fine particulate, which may allow for ease of installation and may provide for a smoother surface. In certain embodiments, the particulate may have a particle size from about 0.05 to about 2 mm in maximum diameter. In one or more embodiments, the particulate may have a particle size of less than approximately 1.00 mm, in other embodiments less than approximately 0.8 mm, and in other embodiments less than approximately 0.6 mm. Particle size, by standard characterization techniques, generally refers to largest axis (e.g., diameter of a spherical particle) of the granule, which may also be referred to as equivalent spherical diameter.

Protective layer is allowed to cure, or dry, after being applied within the area defined by form members. In one or more embodiments, the particulate may be spread or distributed over protective layer once the protective composition has become tacky or adhesive. Particulate becomes adhered to the partially cured protective layer as a result of its adhesive properties. In one or more embodiments, curing of the protective layer may be accelerated by applying a light mist of water to the polyurethane composi-
tion. Those skilled in the art will be able to readily determine a sufficient amount of time necessary to allow the composition to develop enough green strength or tackiness so that the particulate 28 can be applied and efficiently adhered to the composition.

[0024] In one or more embodiments, the particulate 28 may be spread manually over the protective layer 26. In other embodiments, particulate 28 may be spread with the use of a blowing device. The blowing device may be any device capable of blowing particulate 28 over and onto the protective composition. For example, a conventional leaf blower can be used to blow sand near or adjacent to the walkway path 10 onto the protective composition.

[0025] In one or more embodiments, the next step of the installation process for the walkway path 10 may be to allow the protective composition to cure completely after the particulate has been spread over it. Allowing the composition to completely cure before permitting traffic over the protective layer 26, or subjecting the protective layer to the elements, ensures that the particulate will not be dislodged. The result is a durable protective cover forming a walkway path 10 to allow traffic over membrane assembly 12 without risking damage to the membrane assembly. The disclosed method allows for flexibility in installing and creating walkway path 10 not provided by prior art walkway pads. The disclosed method also eliminates costs associated with the manufactured walkway pads of the prior art.

[0026] Various modifications and alterations that do not depart from the scope and spirit of this invention will become apparent to those skilled in the art. This invention is not to be unduly limited to the illustrative embodiments set forth herein.

1. A walkway path produced by a method comprising the steps of:
   - positioning a form member over a roofing membrane assembly to define an interior area;
   - applying a curable composition over the roofing membrane assembly within the interior area; and
   - allowing the curable composition to cure to form a protective layer.

2. The walkway path produced by the process of claim 1, the process further comprising the step of spreading a particulate over the protective composition to form a textured surface after the protective composition has been applied over the roofing membrane assembly and before it has completely cured.

3. The walkway path produced by the process of claim 2, wherein the particulate spread over the protective composition has a particle size of between about 0.05 to about 2.00 mm in diameter.

4. The walkway path produced by the process of claim 2, wherein the particulate is sand.

5. The walkway path produced by the process of claim 1, wherein the step of positioning a form member over a roofing assembly includes positioning a plurality of form members over the roofing assembly.

6. The walkway path produced by the process of claim 1, wherein the curable composition is a one-part polyurethane.

7. The walkway path produced by the process of claim 1, wherein the curable composition is a two-part polyurethane.

8. The walkway path produced by the process of claim 1, wherein the step of applying a curable composition includes applying a liquid curable composition.

9. The walkway path produced by the process of claim 1, wherein the process further includes the step of removing the form member after the protective composition has substantially cured.

10. A method of producing a walkway path over a roofing membrane assembly comprising the steps of:
    - defining outer edges of the walkway path by positioning at least one form member on the membrane assembly;
    - applying a curable composition over the roofing membrane assembly and within an area defined by at least one form member; and
    - allowing the curable composition to cure, thereby forming a protective layer over the membrane assembly and within the at least one form member.

11. The method of claim 10, further comprising the step of spreading a particulate over the curable composition.

12. The method of claim 10, wherein the step of applying the curable composition is performed by pouring a liquid curable composition over the roofing membrane assembly and within the area defined by the form members.

13. The method of claim 10, wherein the step of applying the curable composition is performed by spraying a liquid curable composition over the roofing membrane and within the area defined by the form members.

14. The method of claim 10, wherein the curable composition applied over the roofing membrane assembly includes a polyurethane.

15. The method of claim 10, wherein the curable composition applied over the roofing membrane assembly is a one-part polyurethane.

16. The method of claim 10, wherein the curable composition applied over the roofing membrane assembly is a two-part polyurethane.

17. The method of claim 10, further comprising the step of removing the form members from the roofing membrane assembly after the protective composition has substantially cured.

18. A kit comprising:
    - a plurality of form members;
    - a fluid composition for forming a protective layer over a surface; and
    - an anti-slip particulate.

19. The kit of claim 18, wherein the fluid composition includes a polyurethane.

20. The kit of claim 18, wherein the anti-slip particulate has a particle size of between about 0.05 to about 2.00 mm in diameter.

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