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METHOD AND APPARATUS FOR APPLYING A COATING TO A SURFACE

VERFAHREN UND VORRICHTUNG ZUM AUFTRAGEN EINER BESCHICHTUNG AUF EINE OBERFLÄCHE

PROCÉDÉ ET APPAREIL POUR APPLIQUER UN REVÊTEMENT SUR UNE SURFACE

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Description

[0001] The present invention relates to a method and apparatus for applying a coating to a surface, particularly for applying a coating to a floor or wall. The present invention is described herein by way of a practical example as a method and apparatus for applying a coating to the surface of a children’s play area. However, it is readily applicable to other uses, for example as a surface coating on paths, bridges, steps, gymnasiums, swimming pools, running tracks, decks, in public or industrial buildings or in animal enclosures. In general terms, the present invention is applicable to any surface on which a surface coating which is hard-wearing, weather resistant, shock-absorbing and non-slip would be beneficial.

[0002] Non-slip, shock-absorbing surfaces are commonly used in children’s play areas to cushion the impact of a fall and to reduce the severity of any resulting injury. In general, these surfaces are either bound or unbound.

[0003] Unbound surfaces, such as bark chips, rubber granules, or sand, offer a solution with a low initial cost and easy installation. However, such surfaces have inherent disadvantages such as they are easily displaced, can be swallowed, hide sharp objects or animal excrement, do not enable wheelchair access and require regular maintenance and replenishment in order to remain effective.

[0004] Bound surfaces are typically formed from a rubber filler held within a binding agent. Although more expensive to install than unbound surfaces, these offer a consistent shock-absorbing performance, are easy to clean, are wheelchair accessible and are not easily displaced. The thickness and surface area of shock-absorbing surface required is determined by the "critical fall height" (CFH), where the CFH is determined by the height of the piece of play equipment under which the shock-absorbing surface is to be installed. Two common examples of bound surfaces currently used in children’s play areas are rubber tiles and wetpour systems.

[0005] A rubber tiled surface typically comprises a number of rubber tiles, measuring about one metre square, arranged on and affixed to a concrete or other solid base using adhesive. However, the tiles can only be used on level surfaces and after a few years use are subject to wear, degradation and shrinkage. The edges tend to disintegrate, allowing weeds to grow and disrupt the surface further and further damage may be caused by vandalism. The tiles are difficult and thus expensive to remove and replace.

[0006] Wetpour systems typically comprise a mixture of rubber crumb and a chemical binder. This is mixed and laid by hand. The resulting coating provides a continuous surface that is hard wearing and shock absorbing. However, since the wetpour composition is mixed by hand, it is difficult to maintain consistency between different batches. Further, the wetpour mixture requires approximately twenty four hours to harden, thus the site must be guarded to prevent vandalism while the mixture is setting. The material is also prone to creep at the edges away from a surrounding curb, allowing weeds to grow and presenting a free edge that is more likely to become damaged or vandalised or to become a trip hazard.


[0008] It is an object of the present invention to provide a method and apparatus for applying a surface coating which addresses the above problems.

[0009] The present invention provides a method for applying a coating to a surface, comprising the steps of: providing a sprayable liquid binding agent formed of first and second components; pumping the first and second components of the binding agent to a first dispensing device; combining the first and second components in the first dispensing device to form the binding agent; spraying the binding agent from the first dispensing device on to a surface to be coated; providing a particulate medium comprising one of rubber crumb, sand or grit; providing a second dispensing device comprising a blast nozzle; simultaneously expelling the binding agent from the first dispensing device and the particulate medium from the second dispensing device; characterised in that the particulate medium is expelled into the liquid spray of binding agent produced by the first dispensing device and the blast nozzle is held such that the liquid binding agent is bulked out and coats the particulate medium and adheres it to the surface to form a coating thereon.

[0010] Preferably, the binding agent is formed of first and second components and the method further comprises pumping the first and second components of the binding agent to the first dispensing device and combining the first and second components in the first dispensing device to form the binding agent.

[0011] Preferably, each of the first and second components are heated independently of the other to a temperature of 70-80°C.

[0012] Preferably, the binding agent is a polyurea, the first component is a polyurea hybrid polyol and the second component is a polyurea hybrid isocyanate.

[0013] Preferably, the binding agent is sprayed at a pressure in the range of 500-3500 psi.

[0014] The particulate medium may comprise particulates of between 0.5-5mm in diameter.

[0015] Preferably, the method further comprises applying pressurised, heated air to the surface to be coated to clean and dry the surface before spraying the binding agent and particulate medium.

[0016] Preferably, the coating is applied in a wave-like manner to a first area to be coated, allowing the coating to cure, applying pressurised, heated air to the surface to be coated to remove loose particulates, and repeating the steps above to coat a second area adjacent to the first, and to coat subsequent areas thereafter.

[0017] Preferably, screens are arranged at the borders
of the area to be coated before spraying of the coating.

[0018] Shielding may be provided for structures located in the area to be coated to prevent the coating adhering thereto, except for the lowermost portions of the structures.

[0019] If desired, coatings of different colours may be applied to different areas of a surface to be coated.

[0020] Masks or stencils may be used to apply coating to selected areas of a surface to be coated.

[0021] The present invention also provides apparatus for applying a coating to a surface comprising: a first reservoir comprising first and second containers containing first and second components which are combinable to form a sprayable liquid binding agent; a second reservoir containing a particulate medium; means to heat each of the first and second components which are combinable to form the binding agent immediately before spraying; a means to heat the first and second containers and to combine them to form a sprayable liquid binding agent; a second reservoir containing a particulate medium; liquid dispensing means configured to withdraw binding agent from the first reservoir and dispense it as a liquid spray; and particulate dispensing means configured to withdraw particulate material from the second reservoir and to dispense it in spray form into the spray of liquid binding agent; wherein the particulate medium comprises one of rubber crumb, sand or grit; the second dispensing device comprises a blast nozzle and the liquid dispensing means and particulate dispensing means are configured to simultaneously expel the particulate medium and the binding agent towards the surface; characterised in that the blast nozzle is configured to expel the particulate medium at an angle of approximately 30-45° to the horizontal such that the binding agent is bulked out and coats the particulate medium and adheres it to the surface to form a coating thereon.

[0022] Preferably, the first reservoir comprises first and second containers containing first and second components which are combinable to form the binding agent.

[0023] Preferably, the liquid dispensing means is configured to withdraw the first and second components from the first and second containers and to combine them to form the binding agent immediately before spraying.

[0024] Preferably, the apparatus further comprises means to heat each of the first and second components independently of the other.

[0025] Preferably, the apparatus further comprises a cleaning device configured to spray heated, pressurised air onto a surface to be coated to clean and dry the surface.

[0026] The present invention also provides a children's play area provided with a surface coating applied with the method set out above.

[0027] The present invention will now be described in detail, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of an air lance for use with the apparatus in accordance with a first embodiment of the present invention;

Figure 2 is a schematic representation of an apparatus for applying a binder component of a surface coating in accordance with a first embodiment of the present invention;

Figure 3 is a schematic representation of a part of the apparatus for supplying a particulate component of the surface coating;

Figure 4 is a perspective, part sectional view of an area to be coated;

Figure 5 is a perspective view of an area prepared for coating;

Figure 6 is a schematic view of the application of a surface coating in accordance with the method of the present invention;

Figure 7 is a schematic view illustrating further steps in the method of the present invention;

Figure 8 illustrates a coating applied to a surface and part of an existing structure thereon; and

Figure 9 illustrates use of the present invention to form colours and patterns on a coated surface.

[0028] The various items making up the apparatus of the present invention will now be described, followed by an explanation of how the apparatus is used in the method of the present invention. Broadly, the apparatus consists of means for cleaning and drying a surface to be coated, and means for subsequently applying a coating formed of a binding agent and a particulate medium.

[0029] With reference to Figure 1, a typical air lance 1 for cleaning and drying a surface to be coated is shown. The air lance 1 comprises a nozzle 2 and a shaft 3 in fluid communication with a compressor (not shown) by means of a flexible hose 4. The compressor preferably has an aftercooler and a reheater and a free air delivery rating of not less than 240 cubic feet per minute (0.11 m³/s) at 8 bar. The shaft 3 has two handles 5 and an on/off valve 6. In this example, the nozzle 2 is a fishtail nozzle, such that it is flat and tapers outwardly towards the tip. At the tip of the nozzle 2 is an air gap 7. Typically, the flexible hose 4 has an internal diameter of 3/4 inches (19mm) and the air gap 7 has an area of 300mm².

[0030] Figure 2 represents schematically in block diagram form an apparatus suitable for applying, in liquid form, a binding agent of a surface coating. Preferably, a polyurea hybrid binding agent is used, created from a combination of two liquid components. The apparatus includes a first container 8 and a second container 9, whereby the first and second containers 8, 9 contain first and second liquid components of the binding agent, respectively. Both first and second containers 8, 9 are in fluid communication with a plural component proportioning sprayer 10 (such as the "Reactor E-XP2" available from Graco, Inc., Minneapolis, Minnesota) via supply
As mentioned above, in this example, a two-part binding agent is used. The two parts, i.e. the first and second components, are kept separate until the point of application and, upon combination, undergo a polymerisation reaction to form a fast curing, highly elastomeric and tough polymer which is resistant to impact, tearing and abrasion. A suitable polymer is a polyurea hybrid formed from the reaction of an isocyanate (such as "Polyurea Hybrid Isocyanate") and a resin blend (such as "Polyurea Hybrid Polyol"). The second component, the "resin blend", may also contain additives, such as an adhesion promoter or UV-stabiliser, pigment, colorant and/or one or more catalysts. Advantageously, the second component includes approximately 5% carbon black in liquid form.

The first and second containers 8, 9 each include a transfer pump 15 (such as a "T1" or "T2" pump available from Graco, Inc. Minneapolis, Minnesota) in fluid communication with the inside of the container 8, 9 and connected to supply hoses 11. The containers 8, 9 also include a desiccant dryer 16 to reduce the level of moisture inside the containers 8, 9. The second container 9 is preferably further provided with an agitator 17 (such as a "Twistork™" helix mixer, available from Graco, Inc. Minneapolis, Minnesota) to mix the contents of the second container 9.

However, other binding agents such as other sprayable liquid polymers may be used, whether in a two-part form or another form. If a one-part binding agent is used, then only one container and associated hoses etc. will be required.

The sprayer 10 includes a heater 18, comprising separate heater units (not shown), a motor 19, a control panel 20, pumps 21, circulation valves 22 and outlets 23.

With reference to Figure 3, an apparatus for applying particulate media into the binding agent of the surface coating is shown schematically in block diagram form. The particulate media apparatus 24 has a hopper 25 for containing particulate media, a compressed air inlet 26, a regulator 27, a pressure line 28, a blast line 29, a media control valve 30 and a blast outlet 31. In use, a flexible blast hose and a blast nozzle (not shown) are connected to the blast outlet 31 for the application of particulate matter. A suitable apparatus for applying particulate media is the "1448NC Softstrip Portable Multi-media Blast Cleaning Machine", available from Hodge Clemco Ltd. of Sheffield, United Kingdom. The delivery of media is controlled by the user by means of a deadman's handle (such as the "RM21", available from Hodge Clemco Ltd. of Sheffield, United Kingdom) and a slide valve (such as the "RCAMV6", available from Hodge Clemco Ltd. of Sheffield, United Kingdom) disposed toward the blast nozzle end of the blast hose. In this example, the particulate media is rubber crumb, preferably sized between 0.5mm and 1.5mm.

However, various other surface grade media may also be applied using the present invention. For example various sizes of particulate matter may be used, ranging from rubber dust to rubber crumb of up to 4mm in size. Alternatively, for non-slip applications, sand or grit may be used, ranging in size from very fine kiln dried sand to grit of up to 5mm in size.

With reference to Figure 4, a typical surface to be coated 32 is shown. The surface comprises a solid base 33, typically formed of concrete, on which is placed a top surface 34. Typically the top surface 34 is an existing arrangement of rubber tiles or a layer of wetpour in need of repair/replacement, although the surface to be coated 32 might also be an uncoated concrete or tarmacadam surface. The surface to be coated 32 is bordered by a two inch (51mm) kerb, or a pin kerb 35.

With reference to Figures 5-9, a method of applying a surface coating will now be described.

The air lance 1 is held by the user by handles 5. The on/off valve 6 of the air lance 1 is turned to an "on" position, causing the air lance 1 to expel compressed, dehumidified and heated air from the air gap 7 of nozzle 2. By sweeping the nozzle 2 above the surface to be coated 32, preferably with air lance 1 being held such that the air is expelled at an angle of between approximately 30 and 40 degrees to the horizontal, unwanted matter, such as dirt or dust, which may otherwise negatively affect the adhesion of the surface coating can be lifted and removed from the surface to be coated 32, leaving it clean and dry.

Any breaks, holes or gaps in the surface to be coated are then repaired using adhesive and loose rubber crumb or closed cell foam cut into appropriately sized strips, in order to render the entire surface as a flat, level (or cambered) dry area ready to be coated.

If the underlying surface is irreparatively damaged, the binding agent used in the present invention can be applied as an adhesive in order to stick down rubber tiles, for example of 6mm thickness, to provide a flat even surface for application of the final surface coating.

The kerb 35 is coated in a primer, for instance a two part epoxy primer (such as "Conprime", available from Leeson Polyurethanes Ltd. of Warwick, United Kingdom), and coated in a fine layer of kiln dried sand (such as "Chalford 52"). The air lance 1 is used, as described above, to remove loose sand once the primer has hardened.

In Figure 5, a prepared surface to be coated 32 is shown. Once the surface 32 has been cleaned and dried and the sand has been applied to the kerb 35, screens 36 are erected at the borders of the surface 32 to prevent overspray of the surface coating onto the sur-
rounding area. Ideally, the screens 36 are free-standing "A-boards" formed from PVC and of no less than 150mm in height. The screens 36 are erected immediately out-
side the existing curb structure.

If the surface 32 is in an existing play area, ex-
isting pieces of play equipment must be shielded from overspray. This can be achieved by wrapping at least part of the play equipment in shrink wrap. Nevertheless, preferably, approximately 100mm of the lowermost parts of the equipment, particularly any part which is in contact with, or extends from, the surface 32, are left unprotected by shrink wrap and are thus exposed to the spray. This results in a protective layer of coating at the base of the equipment, as shown in Figure 8. This ensures there are no gaps in the surface around the base of the existing structure which weeds could colonise.

Prior to the spraying of the surface coating, the first and second components of the binding agent are pumped by the transfer pumps 15 and the pumps 21 of the sprayer 10 out of the first and second containers 8, 9, through supply hoses 11 and into separate heater units within the heater 18. After passing through the heater units, the first and second components are returned to the respective containers 8, 9 through return hoses 12, thereby raising the temperature of the components in the containers 8, 9. This temperature rise reduces the vis-
cosity of the component liquids and the curing time of the resulting polymer. The components of the binding agent are heated to approximately 70-80°C. The exact temper-
ature to which each component is raised is dependent upon the nature of the component and the ambient con-
ditions. The temperature of each component should be adjusted to ensure that the delivery is balanced. That is, the viscosity of each component should not be so differ-
ent as to result in the delivery of unequal quantities of the two components. Ideally the Polyurea Hybrid Polyol component is heated to approximately 80°C and the Polyurea Hybrid Isocyanate component heated to ap-
proximately 75°C. The delivery hose 14 is heated to a temperature corresponding to the lowest component tempera-
ture. Therefore, in this example, the delivery hose 14 is ideally heated to 75°C.

Once each of the components has reached the predetermined temperature, the sprayer 10 is set to "spray". This closes the circulation valves 22, preventing the liquid components from recirculating back to the con-
tainers 8, 9 and diverting the liquid components through the outlets 23 to separate hoses within the main delivery hose 14. The liquids are then pressurised to a predeter-
mined level, the pressure level being predetermined by the user dependent on the delivery required from spray gun 13. This pressure can vary from 500 psi to 3500 psi. Preferably, the pressure is approximately 3250 psi.

In addition, the particulate media apparatus 24 is connected to a compressed air source and the hopper 25 is pressurised to approximately 125psi. The flow rate and particulate media delivery is adjusted as required according to the delivery of the binding agent, which may vary for instance due to the dimensions of the nozzle of the spray gun 13.
been described as comprising a two-part polyurea hybrid, other binding agents may be suitable, provided they may be applied in spray form and cure quickly to provide an elastomeric and tough coating which is resistant to impact, tearing and abrasion. Thus, other polymers may be suitable and may be provided in other form, rather than the two-part form described.

[0054] Although the embodiment described above relates to the application of a coating to the surface of a children’s play area, the present invention is readily applicable to other uses, such as a surface coating on paths, bridges, steps, gymnasiums, swimming pools, running tracks, decks, in public or industrial buildings or in animal enclosures.

Claims

1. A method for applying a coating to a surface, comprising the steps of:

- providing a sprayable liquid binding agent formed of first and second components;
- pumping the first and second components of the binding agent to a first dispensing device (10);
- combining the first and second components in the first dispensing device (10) to form the binding agent;
- spraying the binding agent from the first dispensing device (10) on to a surface (32) to be coated;
- providing a particulate medium comprising one of rubber crumb, sand or grit;
- providing a second dispensing device (24) comprising a blast nozzle (37);
- simultaneously expelling the binding agent from the first dispensing device (10) and the particulate medium from the second dispensing device (24);

characterised in that the particulate medium is expelled into the liquid spray of binding agent produced by the first dispensing device (24) and the blast nozzle (37) is held such that the liquid binding agent is bulked out and coats the particulate medium and adheres it to the surface (32) to form a coating thereon.

2. A method as claimed in claim 1 further comprising heating each of the first and second components independently of the other to a temperature of 70-80°C.

3. A method as claimed in claim 1 or claim 2, wherein the binding agent is a polyurea, the first component is a polyurea hybrid polyol and the second component is a polyurea hybrid isocyanate.

4. A method as claimed in any preceding claim comprising spraying the binding agent at a pressure in the range of 500-3500 psi (3.4-24.1 MPa).

5. A method as claimed in any preceding claim, wherein the particulate medium comprises particulates of between 0.5-5mm in diameter.

6. A method as claimed in any preceding claim, further comprising applying pressurised, heated air to the surface (32) to be coated to clean and dry the surface before spraying the binding agent and particulate medium.

7. A method as claimed in claim 6, further comprising applying the coating in a wave-like manner to a first area to be coated, allowing the coating to cure, applying pressurised, heated air to the surface (32) to be coated to remove loose particulates, and repeating the steps above to coat a second area adjacent to the first, and to coat subsequent areas thereafter.

8. A method as claimed in any preceding claim, further comprising arranging screens (36) at the borders of the area to be coated.

9. A method as claimed in any preceding claim, further comprising shielding structures located in the area to be coated to prevent the coating adhering thereto, except for the lowermost portions of the structures.

10. A method as claimed in any preceding claim, further comprising applying coatings of different colours to different areas of a surface to be coated.

11. A method as claimed in any preceding claim, further comprising using masks or stencils to apply coating to selected areas of a surface to be coated.

12. Apparatus for applying a coating to a surface comprising:

- a first reservoir comprising first and second containers (8, 9) containing first and second components which are combinable to form a sprayable liquid binding agent;
- a second reservoir (25) containing a particulate medium;
- liquid dispensing means (10) configured to withdraw binding agent from the first reservoir and dispense it as a liquid spray; and particulate dispensing means (24) configured to withdraw particulate material from the second reservoir (25) and to dispense it in spray form into the spray of liquid binding agent;

wherin the particulate medium comprises one of rubber crumb, sand or grit;

the second dispensing device (24) comprises a...
blasting nozzle (37) and the liquid dispensing means (10) and particulate dispensing means (24) are configured to simultaneously expel the particulate medium and the binding agent towards the surface (32);

characterised in that the blasting nozzle (37) is configured to expel the particulate medium at an angle of approximately 30-45° to the horizontal such that the binding agent is bulked out and coats the particulate medium and adheres it to the surface (32) to form a coating thereon.

13. Apparatus as claimed in claim 12 wherein the liquid dispensing means (10) is configured to withdraw the first and second components from the first and second containers (8, 9) and to combine them to form the binding agent immediately before spraying.

14. Apparatus as claimed in claim 12 or 13 further comprising means to heat (18) each of the first and second components independently of the other.

15. An apparatus as claimed in claim 12, further comprising a cleaning device (1) configured to spray heated, pressurised air onto a surface (32) to be coated to clean and dry the surface.

Patentansprüche

1. Verfahren zum Aufbringen einer Beschichtung auf eine Oberfläche, umfassend die Schritte:

   Bereitstellen eines sprühbaren flüssigen Bindemittels, das aus ersten und zweiten Komponenten gebildet ist;
   Pumpen der ersten und zweiten Komponenten des Bindemittels zu einer ersten Dispergiervorrichtung (10);
   Vereinigen der ersten und zweiten Komponenten in der ersten Dispergiervorrichtung (10), um das Bindemittel zu bilden;
   Sprühen des Bindemittels von der ersten Dispergiervorrichtung (10) auf eine zu beschichtende Oberfläche (32);
   Bereitstellen eines teilchenförmigen Mediums, umfassend eines aus Gummigranulat, Sand oder Grus;
   Bereitstellen einer zweiten Dispergiervorrichtung (24), umfassend eine Strahldüse (37); gleichzeitiges Ausstoßen des Bindemittels aus der ersten Dispergiervorrichtung (10) und des teilchenförmigen Mediums aus der zweiten Dispergiervorrichtung (24);
   dadurch gekennzeichnet, dass das teilchenförmige Medium in den Flüssigkeitsprühnebel des Bindemittels, der durch die erste Dispergiervorrichtung (24) erzeugt wird, ausgestoßen wird, und die Strahldüse (37) so gehalten wird, dass das teilchenförmige Medium in einem Winkel von ungefähr 30 bis 45° zur Horizontalen ausgestoßen wird, so dass das flüssige Bindemittel ausgegeben wird und das teilchenförmige Medium beschichtet und es an die Oberfläche (32) anhaftet, um darauf eine Beschichtung zu bilden.

2. Verfahren nach Anspruch 1, weiterhin umfassend ein Erwärmen der ersten und zweiten Komponente, jeweils unabhängig von der anderen, auf eine Temperatur von 70 - 80 °C.

3. Verfahren nach Anspruch 1 oder Anspruch 2, worin das Bindemittel ein Polyharnstoff ist, die erste Komponente ein Polyharnstoffhybridpolyol ist und die zweite Komponente ein Polyharnstoffhybridsicyanat ist.

4. Verfahren nach einem der vorhergehenden Ansprüche, umfassend ein Aufsprühen des Bindemittels mit einem Druck im Bereich von 500 - 3500 psi (3,4 - 24,1 MPa).

5. Verfahren nach einem der vorhergehenden Ansprüche, worin das Teilchenförmige Medium Teilchen mit zwischen 0,5 und 5 mm Durchmesser umfasst.

6. Verfahren nach einem der vorhergehenden Ansprüche, weiterhin umfassend das Anwenden von erwärmter Druckluft auf die zu beschichtende Oberfläche (32), um die Oberfläche vor dem Aufsprühen von Bindemittel und Teilchenförmigem Medium zu reinigen und zu trocknen.

7. Verfahren nach Anspruch 6, weiterhin umfassend das Aufbringen der Beschichtung in einer wellenförmigen Form auf einen ersten zu beschichtenden Bereich, Aushärtelnlassen der Beschichtung. Anwenden von erwärmter Druckluft auf die zu beschichtende Oberfläche (32), um lose Teilchen zu entfernen und Wiederholen der obigen Schritte, um einen zweiten Bereich, der dem ersten Bereich nahe liegt, zu beschichten, und hiernach weitere Bereiche zu beschichten.


9. Verfahren nach einem der vorhergehenden Ansprüche, weiterhin umfassend Abschirmungsstrukturen, die in dem zu beschichtenden Bereich angeordnet sind, um zu verhindern, dass die Beschichtung daran anhaftet, ausgenommen die untersten Teile der Strukturen.


12. Vorrichtung zum Aufbringen einer Beschichtung auf eine Oberfläche, umfassend:
   einen ersten Vorratsbehälter, umfassend erste und zweite Behältnisse (8, 9), enthaltend erste und zweite Komponenten, die vereinbar sind, um ein sprühbares flüssiges Bindemittel zu bilden;
   einen zweiten Vorratsbehälter (25), der ein teilchenförmiges Medium enthält;
   Flüssigkeitdispengiermittel (10), das konfiguriert ist, um Bindemittel von dem ersten Vorratsbehälter abzuleiten und es als ein Flüssigkeits- sprühnebel auszugeben; und
   Teilchendispergiermittel (24), das konfiguriert ist zum Ableiten von teilchenförmigem Material von dem zweiten Vorratsbehälter (25) und um es in Sprühnebelform in den Sprühnebel von flüssigem Bindemittel auszugeben; worin das teilchenförmige Medium eines aus Gummigranulat, Sand oder Grus umfasst;
   wobei die zweite Dispergiervorrichtung (24) eine Strahldüse (37) umfasst und das Flüssigkeitdispengiermittel (10) und das Teilchendispergiermittel (24) so konfiguriert sind, um gleichzeitig das teilchenförmige Medium und das Bindemittel in Richtung der Oberfläche (32) auszustoßen, dadurch gekennzeichnet, dass die Strahldüse (37) so konfiguriert ist, um das teilchenförmige Medium mit einem Winkel von ungefähr 30 - 45 ° zur Horizontalen auszustoßen, sodass das Bindemittel ausgegeben wird und das teilchenförmige Medium beschichtet und es an die Oberfläche (32) anhaftet, um darauf eine Beschichtung zu bilden.

13. Vorrichtung nach Anspruch 12, worin das Flüssigkeitdispengiermittel (10) konfiguriert ist, um erste und zweite Komponenten von den ersten und zweiten Behältnissen (8, 9) abzuleiten und sie zu vereinigen, um das Bindemittel unmittelbar vor dem Sprühen zu bilden.


15. Vorrichtung nach Anspruch 12, weiterhin umfassend eine Reinigungseinheit (1), um erwärmte Druckluft auf eine zu beschichtende Oberfläche (32) zu düsen, um die Oberfläche zu reinigen und zu trocknen.

Revendications

1. Procédé d’application d’un revêtement à une surface, comprenant les étapes de :
   réaliser un agent de liaison liquide pulvérisable constitué de premier et deuxième composants ;
   pomper les premier et deuxième composants de l’agent de liaison à un premier dispositif de distribution (10) ;
   combiner les premier et deuxième composants dans la premier dispositif de distribution (10) pour former l’agent de liaison ;
   pulvériser l’agent de liaison du premier dispositif de distribution (10) sur une surface (32) à revêtir ;
   réaliser un milieu particulaire comprenant un parmi des granulats de caoutchouc, du sable ou du gravier ;
   réaliser un deuxième dispositif de distribution (24) comprenant une buse de pulvérisation (37) ;
   expulser simultanément l’agent de liaison du premier dispositif de distribution (10) et le milieu particulaire du deuxième dispositif de distribution (24) ;
   caractérisé en ce que le milieu particulaire est expulsé dans la pulvérisation de liquide de l’agent de liaison produit par le premier dispositif de distribution (24) et la buse de pulvérisation (37) est retenue de telle sorte que le milieu particulaire est expulsé selon un angle d’environ 30-45 ° à l’horizontale de façon que l’agent de liaison liquide est expulsé en vrac et revêt le milieu particulaire et le fait adhérer à la surface (32) pour former le revêtement sur celle-ci.

2. Procédé selon la revendication 1, comprenant en outre le chauffage de chacun des premier et deuxième composants indépendamment de l’autre à une température de 70-80°C.

3. Procédé selon la revendication 1 ou la revendication 2, dans lequel l’agent de liaison est une poly-urée, le premier composant est un polyol hybride de poly-urée, et le deuxième composant est un iso-cyanate hybride de poly-urée.

4. Procédé selon l’une quelconque des revendications précédentes, comprenant la pulvérisation de l’agent de liaison à une pression dans la plage de 500-3500 psi (3,4-24,1 MPa).
5. Procédé selon l'une quelconque des revendications précédentes, dans lequel le milieu particulaire comprend des particules d'un diamètre entre 0,5-5mm.

6. Procédé selon l'une quelconque des revendications précédentes, comprenant en outre l’application d’un air chauffé sous pression à la surface (32) à revêtir pour nettoyer et sécher la surface avant la pulvérisation de l’agent de liaison et du milieu particulaire.

7. Procédé selon la revendication 6, comprenant en outre l’application du revêtement d’une manière ondulée sur une première zone à revêtir, en permettant au revêtement de durcir, en appliquant de l’air chauffé sous pression à la surface (32) à revêtir pour supprimer des particules lâches, et la répétition des étapes ci-dessus pour revêtir une deuxième zone adjacente à la première, et pour revêtir des zones suivantes ensuite.


10. Procédé selon l’une quelconque des revendications précédentes, comprenant en outre l’application de revêtements de différentes couleurs à des zones différentes d’une surface à revêtir.

11. Procédé selon l’une quelconque des revendications précédentes, comprenant en outre l’utilisation de masques ou de pochoirs pour appliquer un revêtement à des zones sélectionnées d’une surface à revêtir.

12. Appareil pour l’application d’un revêtement à une surface, comprenant :

   un premier réservoir comprenant des premier et deuxième conteneurs (8, 9) contenant des premier et deuxième composants qui peuvent être combinés pour former un agent de liaison liquide pulvérisable ;

   un deuxième réservoir (25) contenant un milieu particulaire ;

   un moyen de distribution de liquide (10) configuré pour retirer l’agent de liaison du premier réservoir et pour le distribuer comme un spray liquide ; et

   un moyen de distribution de matériau particulier (24) configuré pour retirer le matériau particulier du deuxième réservoir (25) et pour le distribuer sous forme de spray dans le spray de l’agent de liaison liquide ; où le milieu particulaire comprend un parmi des granulats de caoutchouc, du sable ou du gravier ; le deuxième dispositif de distribution (24) comprenant une buse de pulvérisation (37) et le moyen de distribution de liquide (10) et le moyen de distribution de matériau particulier (24) sont configurés pour expulser simultanément le milieu particulaire et l’agent de liaison vers la surface (32) ; caractérisé en ce que la buse de pulvérisation (37) est configuré pour expulser le milieu particulier selon un angle d’environ 30-45° à l’horizontale de sorte que l’agent de liaison est expulsé en vrac et revête le milieu particulier et le fait adhérer à la surface (32) pour former un revêtement sur celle-ci.

13. Appareil selon la revendication 12, dans lequel le moyen de distribution de liquide (10) est configuré pour retirer les premier et deuxième composants des premier et deuxième conteneurs (8, 9) et pour les combiner pour former l’agent de liaison directement avant la pulvérisation.


15. Appareil selon la revendication 12, comprenant en outre un dispositif de nettoyage (1) pour pulvériser de l’air chauffé sous pression sur une surface (32) à revêtir pour nettoyer et sécher la surface.
FIG. 8
REFERENCES CITED IN THE DESCRIPTION

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