Claims

1. A method of preparing a cement treated base composition, the method comprising:

(a) providing an amount of aggregate material and an amount of cementitious material, the aggregate material and cementitious material having a combined dry mass;

(b) mixing the aggregate material and the cementitious material to form a mixture; and

(c) if necessary, providing an amount of water to the mixture to form the composition, wherein a moisture content of the composition is between 7.0wt% and 10.5wt% of the combined dry mass,

wherein the aggregate material has a particle size distribution in weight percentage of the aggregate material as follows:

(d) 100% smaller than 51 mm;

(e) 55 to 100% smaller than 4.75 mm;

(f) 45 to 80% smaller than 2.00 mm;

(g) 25 to 50% smaller than 0.425 mm; and

(i) 10 to 25% smaller than 0.180 mm.

2. The method according to claim 1, wherein the moisture content of the composition is between 8.0wt% to 9.0wt% of the combined dry mass.

3. The method according to any one of claims 1 or 2, wherein the amount of cementitious material present in the composition is between 2.0wt% to 6.0wt% of the aggregate material.

4. The method according to claim 3, wherein the amount of cementitious material present in the composition is between 3.0wt% to 5.0wt% of the aggregate material.

5. The method according to any of the preceding claims, wherein the aggregate material comprising particles having irregular shapes and sizes.

6. The method according to any of the preceding claims, wherein the aggregate material has a water content of 6wt% or less.

7. The method according to any of the preceding claims, wherein the aggregate material is any one selected from the group comprising: manufactured fines, crushed gravel, recycled concrete aggregates, recycled asphalt, slag, and crushed granite.

8. The method according to any of the preceding claims, wherein the cementitious material is any one selected from the group comprising: cement, ground granulated blast furnace slag, and fly ash.

9. The method according to claim 8, wherein the cement is Ordinary Portland Cement.

10. The method according to any of the preceding claims, further comprising adding at least one additive to the mixture, wherein the at least one additive is any one selected from the group comprising: an accelerator, a retarder, ground granulated blast furnace slag, and fly ash.

11. A method of preparing a cement treated base comprising the method of any of the preceding claims, and further comprising allowing sufficient time for the cement treated base composition to set into a solid mass.

12. A cement treated base prepared by a method according to claim 11.

13. The cement treated base according to claim 12, wherein the cement treated base has a 7 day compressive strength of 2.069 x 10^6 m^{-1} kg s^{-2} to 7.584 x 10^6 m^{-1} kg s^{-2} (also expressed as 2.069 N/mm^2 to 7.584 N/mm^2 or 300 to 1100psi), and a 28 day compressive strength of 1.0342 x 10^7 m^{-1} kg s^{-2} (also expressed as 10.342 N/mm^2 or 1500psi) or less.

14. The cement treated base according to claim 12, wherein the cement treated base has a 7 day compressive strength of 2.758 x 10^6 m^{-1} kg s^{-2} to 5.516 x 10^6 m^{-1} kg s^{-2} (also expressed as 2.758 N/mm^2 to 5.516 N/mm^2 or 400 to 800psi), and a 28 day compressive strength of 6.895 x 10^6 m^{-1} kg s^{-2} (also expressed as 6.895 N/mm^2 or 1000psi) or less.

15. The cement treated base according to claim 12, wherein the cement treated base has an elastic modulus of less than 3.5 x 10^9 m^{-1} kg s^{-2} (3.5 GPa).

16. The cement treated base according to claim 12, wherein the cement treated base has an elastic modulus of between 0.2 x 10^9 m^{-1} kg s^{-2} to 2.0 x 10^9 m^{-1} kg s^{-2} (0.2 GPa to 2.0 GPa).

17. Use of a cement treated base according to any one of claims 12 to 16 as a base course for airport runways or taxiways.

18. A cement treated base composition comprising:

(a) an aggregate material, wherein the aggregate material has a particle size distribution in weight percentage of the aggregate material as follows:

i) 100% smaller than 51 mm;

ii) 55 to 100% smaller than 4.75 mm;

iii) 45 to 80% smaller than 2.00 mm;

iv) 25 to 50% smaller than 0.425 mm; and

v) 10 to 25% smaller than 0.180 mm; and

(b) a cementitious material,

wherein the aggregate material and the cementitious material has a combined dry mass, and the composition has a moisture content of between 7.0wt% and 10.5wt% of the combined dry mass.

19. The cement treated base composition according to claim 18, wherein the moisture content of the composition is between 8.0wt% to 9.0wt% of the combined dry mass.

20. The cement treated base composition according to any one of claims 18 or 19, wherein the amount of cementitious material present in the composition is between 2.0wt% to 6.0wt% of the aggregate material.

21. The cement treated base composition according to any one of claims 18 to 20, wherein the amount of cementitious material present in the composition is between 3.0wt% to 5.0wt% of the aggregate material.

22. The cement treated base composition according to any of claims 18 to 21, wherein the aggregate material contains particles having irregular shapes and sizes.

23. The cement treated base composition according to any of claims 18 to 22, wherein the aggregate material has a water content of 6wt% or less.

24. The cement treated base composition according to any of claims 18 to 23, wherein the aggregate material is any one selected from the group comprising: manufactured fines, crushed gravel, stone recycled concrete, recycled asphalt, slag, and crushed granite.

25. The cement treated base composition according to any of claims 18 to 24, wherein the cementitious material is any one selected from the group comprising: cement, ground granulated blast furnace slag, and fly ash.

26. The cement treated base composition according to claim 25, wherein the cement is Ordinary Portland Cement.

27. The cement treated base composition according to any of claims 18 to 26, further comprising at least one additive, wherein the at least one additive is any one selected

from the group comprising: an accelerator, a retarder, ground granulated blast furnace slag, and fly ash.

28. The cement treated base composition according to claim 18, wherein when set into a solid mass has a 7 day compressive strength of 2.069 x 10^6 m^{-1} kg s^{-2} to 7.584 x 10^6 m^{-1} kg s^{-2} (also expressed as 2.069 N/mm^2 to 7.584 N/mm^2 or 300 to 1100psi), and a 28 day compressive strength of 1.0342 x 10^7 m^{-1} kg s^{-2} (also expressed as 10.342 N/mm^2 or 1500psi) or less.

29. The cement treated base composition according to claim 18, wherein when set into a solid mass has a 7 day compressive strength of 2.758 x 10^6 m^{-1} kg s^{-2} to 5.516 x 10^6 m^{-1} kg s^{-2} (also expressed as 2.758 N/mm^2 to 5.516 N/mm^2 or 400 to 800psi), and a 28 day compressive strength of 6.895 x 10^6 m^{-1} kg s^{-2} (also expressed as 6.895 N/mm2 or 1000psi) or less.

30. The cement treated base composition according to claim 18, wherein when set into a solid mass has an elastic modulus of less than 3.5 x 10^9 m^{-1} kg s^{-2} (3.5 GPa).

31. The cement treated base composition according to claim 18, wherein when set into a solid mass has an elastic modulus of between 0.2 x 10^9 m^{-1} kg s^{-2} to 2.0 x 10^9 m^{-1} kg s^{-2} (0.2 GPa to 2.0 GPa).