CLAIMS

What is claimed is:

1. A method of making cementitious-based material having a compressive strength greater than about 1,000 psi, the method comprising:

placing a cementitious-based material in an insulated concrete form or mold wherein the insulated concrete form or mold has an R-value of at least 1.5;

wherein the cementitious-based material comprises:

aggregate;

cementitious material, wherein the cementitious material comprises approximately 10% to approximately 80% by weight portland cement, approximately 20% to approximately 90% by weight slag cement, and 0% to approximately 80% by weight fly ash; and

water sufficient to hydrate the cementitious-based material.

2. The method of Claim 1 further comprising allowing the cementitious-based material to at least partially cure in the insulated concrete form.

3. The method of Claim 1 further comprising allowing the cementitious-based material to cure in the insulated concrete form.

4. The method of Claim 1, wherein the cementitious-based material comprises approximately one-third by weight portland cement, approximately one-third by weight slag cement and approximately one-third by weight fly ash.

5. The method of Claim 1, wherein the insulated concrete form has an R-value of at least 4.

6. The method of Claim 1, wherein the insulated concrete form has an R-value of at least 8.

7. The method of Claim 1, wherein the weight ratio of portland cement to slag cement to fly ash is approximately 1 to 1 to 1.

8. The method of Claim 1, wherein the weight ratio of portland cement to slag cement to fly ash is approximately 0.85-1.15:0.85-1.15:0.85-1.15.

9. The method of Claim 1, wherein the weight ratio of portland cement to slag cement to fly ash is approximately 0.9-1.1:0.9-1.1:0.9-1.1.

10. The method of Claim 1, wherein the weight ratio of portland cement to slag cement to fly ash is approximately 0.95-1.05:0.95-1.05:0.95-1.05.

11. The method of Claim 5, wherein the weight ratio of portland cement to slag cement to fly ash is approximately 1 to 1 to 1.

12. The method of Claim 5, wherein the weight ratio of portland cement to slag cement to fly ash is approximately 0.85-1.15:0.85-1.15:0.85-1.15.

13. The method of Claim 5, wherein the weight ratio of portland cement to slag cement to fly ash is approximately 0.9-1.1:0.9-1.1:0.9-1.1.

14. The method of Claim 5, wherein the weight ratio of portland cement to slag cement to fly ash is approximately 0.95-1.05:0.95-1.05:0.95-1.05.

15. The method of Claim 1, wherein the cementitious-based material has a seven-day compressive strength equal to at least 65% of its ninety-day compressive strength.

16. The method of Claim 1, wherein the cement-based object or structure is a vertical concrete wall, column, elevated slab, roof system, horizontal concrete panel,

precast concrete beam, precast concrete panel, precast concrete pipe, precast concrete vault, precast concrete roof system, precast concrete pavers, precast concrete bricks, precast synthetic stone, precast concrete block, concrete slab on grade, or concrete cast-in-place spanning elements.

17. The method of Claim 1, wherein the insulated concrete form or mold comprises a pair of rectangular vertically oriented insulating layers horizontally spaced from each other.

18. The method of Claim 1, wherein the insulated concrete form or mold comprises a pair of rectangular horizontally oriented insulating layers vertically spaced from each other.

19. The method of Claim 1, wherein the insulated concrete form or mold comprises a first portion comprising an insulating layer and a second portion comprising an insulated blanket.

20. The method of Claim 1, wherein the insulated concrete form or mold comprises a first portion comprising an insulating foam panel and a second portion comprising an electrically heated blanket.

21. The method of Claim 1, wherein the insulated concrete form or mold comprises a conventional concrete form having insulating material on a side opposite a concrete contacting portion.

22. A method of making a cement-based object or structure having a compressive strength greater than about 1,000 psi, the method comprising:

placing a plastic cement-based material in an insulated concrete form, wherein the insulated concrete form has an R-value of at least 1.5;

wherein the cement-based material comprises:

aggregate;

cementitious material, wherein the cementitious material comprises approximately 10% to approximately 80% by weight portland cement and the remaining cementitious material comprising one or more supplementary cementitious materials; and

water sufficient to hydrate the cementitious material; and

wherein at 3 to 7 days the cement-based material in the insulated concrete form has a compressive strength at least 25% greater than the same cement-based material would have after the same time in a non-insulated concrete form under the same conditions.

23. The method of Claim 22, wherein at 3 to 7 days the cement-based material in the insulated concrete form has a compressive strength at least 50% greater than the same cement-based material would have after the same time in a non-insulated concrete form under the same conditions.

24. The method of Claim 22, wherein at 3 to 7 days the cement-based material in the insulated concrete form has a compressive strength at least 100% greater than the same cement-based material would have after the same time in a non-insulated concrete form under the same conditions.

25. The method of Claim 22, wherein the supplementary cementitious material is slag cement, fly ash, silica fume; metakaolin, rice husk ash, ground burnt clay bricks, brick dust, bone ash, animal blood, clay, sodium hydroxide, or magnesium hydroxide.

26. The method of Claim 22, wherein the supplementary cementitious material is siliceous, aluminous or aluminosiliceous materials that react with calcium hydroxide in the presence of water; hydroxide-containing compounds; or any other compound having reactive hydrogen groups.

27. The method of Claim 22, wherein the cement-based material further comprises an inert filler.

28. The method of Claim 27, wherein the inert filler is ground limestone, calcium carbonate, titanium dioxide, or quartz.

29. A method of making a cement-based material having a compressive strength greater than about 1,000 psi, the method comprising:

placing a plastic cement-based material in a horizontal insulated concrete form, wherein the insulated concrete form has an R-value of at least 1.5;

wherein the cement-based material comprises:

aggregate;

cementitious material, wherein the cementitious material comprises:

approximately 10% to approximately 90% by weight portland cement;

at least one of 10% to approximately 90% by weight or less slag cement and 5% to approximately 80% by weight fly ash; and

water sufficient to hydrate the cementitious material.

30. The method of Claim 29, wherein the insulated concrete form has an R-value of at least 4.

31. A method of making a cement-based object or structure having a compressive strength greater than about 1,000 psi, the method comprising:

placing a plastic cementitious-based material in an insulated concrete form, wherein the insulated concrete form has an R-value of at least 1.5 whereby at least a portion of the initial heat of hydration of the cementitious-based material is retained in the insulated concrete form or mold;

wherein the cementitious-based material comprises:

aggregate; and

cementitious material, wherein the cementitious material consists essentially of approximately 10% to approximately 80% by weight portland cement and the remaining cementitious material comprising one or more supplementary cementitious materials selected from slag cement and fly ash.

32. A method of making a cement-based object or structure having a compressive strength greater than about 1,000 psi, the method comprising:

placing a plastic cementitious-based material in an insulated concrete form, wherein the insulated concrete form has an R-value of at least 1.5 whereby at least a portion of the initial heat of hydration of the cementitious-based material is retained in the insulated concrete form or mold;

wherein the cementitious-based material comprises:

aggregate; and

cementitious material, wherein the cementitious material consists essentially of approximately 10% to approximately 80% by weight portland cement and the remaining cementitious material comprising one or more supplementary cementitious materials selected from slag cement, fly ash, silica fume, rice husk ash, metakaolin, and other siliceous, aluminous or aluminosiliceous materials that react with calcium hydroxide in the presence of water.

33. A method of making a cement-based object or structure having a compressive strength greater than about 1,000 psi, the method comprising:

placing a plastic cementitious-based material in an insulated concrete form, wherein the insulated concrete form has an R-value of at least 1.5 whereby at least a portion of the initial heat of hydration of the cementitious-based material is retained in the insulated concrete form or mold;

wherein the cementitious-based material comprises:

aggregate; and

cementitious material, wherein the cementitious material consists essentially of approximately 10% to approximately 80% by weight portland cement and the remaining cementitious material comprising one or more pozzolanic materials.

34. The method of any one of Claims 31, 32 or 33, wherein the cementitious material consists essentially of approximately 10% to approximately 70% by weight portland cement.

35. The method of any one of Claims 31, 32 or 33, wherein the cementitious material consists essentially of approximately 10% to approximately 60% by weight portland cement.

36. The method of any one of Claims 31, 32 or 33, wherein the cementitious material consists essentially of approximately 10% to approximately 50% by weight portland cement.

37. A method of making a cement-based object or structure having a compressive strength greater than about 1,000 psi, the method comprising:

placing a plastic cementitious-based material in an insulated concrete form, wherein the insulated concrete form has an R-value of at least 1.5 whereby at least a portion of the initial heat of hydration of the cementitious-based material is retained in the insulated concrete form or mold;

wherein the cementitious-based material comprises:

aggregate; and

cementitious material, wherein the cementitious material consists essentially of one or more supplementary cementitious materials selected from slag cement and fly ash; and

one or more of calcium oxide, calcium hydroxide, calcium carbonate, sodium hydroxide, magnesium hydroxide, or latex or polymer admixtures that have reactive hydroxyl groups.

38. A method of making a cement-based object or structure having a compressive strength greater than about 1,000 psi, the method comprising:

placing a plastic cementitious-based material in an insulated concrete form, wherein the insulated concrete form has an R-value of at least 1.5 whereby at least a portion of the initial heat of hydration of the cementitious-based material is retained in the insulated concrete form or mold;

wherein the cementitious-based material comprises:

aggregate; and

cementitious material, wherein the cementitious material consists essentially of one or more supplementary cementitious materials selected from slag cement, fly ash, silica fume, rice husk ash, metakaolin, and other siliceous, aluminous or aluminosiliceous materials that react with calcium hydroxide in the presence of water; and

one or more of calcium oxide, calcium hydroxide, calcium carbonate, sodium hydroxide, magnesium hydroxide, or latex or polymer admixtures that have reactive hydroxyl groups.

39. (New) A method of making a cement-based object or structure having a compressive strength greater than about 1,000 psi, the method comprising:

placing a plastic cementitious-based material in an insulated concrete form, wherein the insulated concrete form has an R-value of at least 1.5 whereby at least a portion of the initial heat of hydration of the cementitious-based material is retained in the insulated concrete form or mold;

wherein the cementitious-based material comprises:

aggregate; and

cementitious material, wherein the cementitious material consists essentially of:

one or more pozzolanic materials, and

one or more of calcium oxide, calcium hydroxide, calcium carbonate, sodium hydroxide, magnesium hydroxide, or latex or polymer admixtures that have reactive hydroxyl groups.

40. The method of any one of Claims 31 to 39, wherein the insulated concrete form has an R-value of at least 4.

41. The method of any one of Claims 31 to 39, wherein the insulated concrete form has an R-value of at least 8.

42. The method of any one of Claims 31 to 39, wherein the cementitious material further consists essentially of approximately 0.1% to approximately 10% by weight Wollastonite.

Dated this 29th day of May, 2014.

(MEENAKSHI MAHARAJ)
(REGN. NO. - IN/PA-1064)
OF D. P. AHUJA & CO.
APPLICANT'S AGENT