Claims

1. A method for producing aggregate particles from cementitious compositions, comprising:

combining in a vessel a cementitious composition and at least one aggregate-forming inducer that provides a surface anchoring site for bonding/adhering to cement paste ~~to bond/adhere to~~, wherein the at least one aggregate-forming inducer comprises a fiber having an elongated body with a length to equivalent diameter ratio of at least 10 and that, when added to ~~concrete~~the cementitious composition, introduces anchoring surface area for said cementitious composition between 275 and 50,000 square meters per cubic meter of cementitious composition~~.~~,

~~2. The method of claim 1, wherein said anchoring surface area is between 500 and 10,000 square meters per cubic meter of cementitious composition.~~

~~3. The method of claim 1, wherein the fiber having an elongated body has a length to equivalent diameter ratio of at least 50.~~

~~4. The method of claim 1, wherein the fiber having an elongated body increases its specific surface area during mixing of the concrete due to surface roughening or fibrillation by at least 10 percent.~~

~~5. The method of claim 1, wherein said vessel is the drum of a concrete mixing truck or a stationary mixing drum or pan or any mixing vessel where the vessel rotates or the mixing blades rotate.~~

~~6. The method of claim 1 wherein the time needed to combine said at least one aggregate-forming inducer and the cementitious composition and convert the resulting mix to a granular material is 1 to 10 minutes per cubic yard of cementitious composition.~~

~~7. The method of claim 1 wherein the aggregate-forming inducer does not negatively impact subsequent concrete mixes with regard to its plastic and hardened properties chosen from air, unit weight, slump, set time and strength.~~

~~8. The method of claim 1 wherein the cementitious composition is residual or returned concrete or is a cementitious paste fraction separated from residual or returned concrete.~~

~~9. The method of claim 1~~ wherein the at least one aggregate-forming inducer is chosen from shredded and/or cut paper, cardboard, corrugated cardboard, cartons, corrugated cartons, crepe paper, news print, kraft paper, wall paper, wax paper, silk paper; shredded currencies removed from circulation ~~(US and Foreign);~~; wood fibers; glass fibers; shredded textiles; cotton fibers; hemp; mineral fiber chosen from wollastonite, mica, rock wool, slag wool, and graphite; polyolefin fibers~~;~~, such as polypropylene fibers, polyethylene fibers~~, or~~ and blends thereof; polyvinyl alcohol ~~(PVA);~~; carbon fibers; nylon; para-aramid synthetic fiber; polyester fibers, natural fibers chosen from sisal fibers, cotton, flax, jute, coconut husks, protein-based fibers, banana, pineapple, wool, mohair and silk; shredded polystyrene, shredded PET; and mixtures of any of the foregoing.

2. ~~10 .~~The method of claim ~~9~~1, wherein:

a) said anchoring surface area is between 500 and 10,000 square meters per cubic meter of cementitious composition; or

b) the fiber having an elongated body has a length to equivalent diameter ratio of at least 50.

3. The method of claim 1, wherein the fiber having an elongated body increases its specific surface area during mixing of the concrete due to surface roughening or fibrillation by at least 10 percent.

4. The method of claim 1, wherein said vessel is the drum of a concrete mixing truck or a stationary mixing drum or pan or any mixing vessel where the vessel rotates or the mixing blades rotate.

5. The method of claim 1 wherein the cementitious composition is:

(a) residual or returned concrete; or

(b) a cementitious paste fraction separate from residual or returned concrete.

6. The method of claim 1, wherein said polyolefin fibers are polypropylene fibers, polyethylene fibers or blends thereof have a surface area per unit weight between 100 and 400 square meters per kilogram.

~~11.~~ 7. The method of claim 1, wherein said aggregate-forming inducer is news print.

~~12.~~ 8. The method of claim ~~11~~7, wherein said news print is shredded and has a surface area per unit weight between 10 and 500 square meters per kilogram.

~~13.~~ 9. The method of claim 1 wherein the cementitious composition is returned concrete in a delivery truck mixer-drum, and the at least one aggregate-forming inducer is shredded newsprint.

~~14.~~ 10. The method of claim 1, further comprising the addition of an admixture chosen from one or more set accelerators, set retarders, water reducers, rheology modifiers chosen from clay, super absorbent polymers and thickeners, corrosion inhibitors, shrinkage reducing admixtures, colorants, air entrainers, air detrainers, and combinations thereof.

~~15.~~11. The method of claim ~~14~~10, wherein said set accelerator is aluminum sulfate, aluminum trihydrate, calcium nitrate, calcium nitrite, calcium chloride, sodium nitrate, thiocyanate or mixtures thereof.

~~16.~~12. The method of claim 1, further comprising the addition of a super absorbent polymer chosen from sodium polyacrylate, carboxyalkyl cellulose polymers, carboxyalkyl

starch polymers, ~~alginates, chitosans, starches, polyacrylic acid polymers, polyacrylamide polymers and polyaspartic acid polymers.~~

~~17.~~ ~~Aggregate particles formed by the~~

alginates, chitosans, and starches, polyacrylic acid polymers, polyacrylamide polymers and polyaspartic acid polymers.

13. The method of claim ~~1.~~

~~18. A packaged~~ 10, wherein the admixture ~~comprising an aggregate-forming inducer comprising a fiber having an elongated body with a length to equivalent diameter ratio of at least 10 and an admixture~~is chosen from one or more of set accelerators, set retarders~~,~~ and rheology modifiers ~~and thickeners.~~

~~19. A single-use container consisting essentially of one or more aggregate-forming inducers of claim 1, the one or more aggregate-forming inducers having an elongated body with a length to equivalent diameter ratio of at least 10.~~

~~20. The single-use container of claim 19, wherein the one or more aggregate-forming inducers is news print.~~

~~21. The single use container of claim 19, wherein the container is a paper bag, water soluble bag, pulpable bag, or plastic bag.~~

~~22. A method for producing aggregate particles from cementitious compositions, comprising: combining a cementitious composition and a formulation consisting essentially of at least one aggregate forming inducer, wherein the at least one aggregate forming inducer when added to said cementitious composition introduces surface area between 275 and 50,000 square meters per cubic meter of cementitious composition, and mixing said cementitious composition with said formulation until the mixed components form granular material.~~

~~23. The method of claim 22, wherein said formulation is combined with said cementitious material with a conveyor belt, a pneumatic system, a blower or a dispenser.~~

~~24. A cementitious composition comprising a paste portion and aggregate formed by the method of claim 1~~.

~~25.~~14. The method of claim 1 wherein the vessel is a rotatable concrete mixer drum mounted on a concrete ready-mix delivery vehicle, ~~the method~~and further ~~comprising monitoring the~~wherein concrete within the mixer drum ~~using~~is monitored by an automated slump monitoring system to ensure that the aggregate-forming inducer becomes uniformly mixed within concrete contained within the mixer drum.

15. A packaged admixture comprising an aggregate-forming inducer comprising a fiber having an elongated body with a length to equivalent diameter ratio of at least 10 and an admixture chosen from one or more of set accelerators, set retarders and rheology modifiers, wherein the aggregate-forming inducer is provided in a container selected from a paper bag, pulpable bag, water-soluble

polymer bag and/or plastic bag and the aggregate-forming inducer is news print.