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 for adhering to cement paste, 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, when added to the cementitious composition, introduces a surface of between 500 and 10,000 square meters per cubic meter for cement paste to bond/adhere to,

wherein the at least one aggregate-forming inducer is chosen from shredded and/or cut paper, cardboard, corrugated cardboard, cartons, corrugated cartons, crepe paper, newsprint, kraft paper, wall paper, wax paper, silk paper, shredded currencies removed from circulation, wood fibers, glass fibers, shredded textiles, cotton fibers, hemp, mineral fiber chosen from wollastonite, mica, rock wool, slag wool, graphite, natural fibers chosen from sisal fibers, cotton, flax, jute, coconut husks, protein-based fibers, banana, pineapple, wool, mohair, silk, and mixtures of any of the foregoing.

2. The method of claim 1, wherein said surface area is between 1,000 and 5,000 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 said aggregate-forming inducer is newsprint.

10. The method of claim 9, wherein said newsprint is shredded and has a surface area per unit weight between 10 and 500 square meters per kilogram.

11. 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.

12. 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.

13. The method of claim 12, wherein said set accelerator is aluminum sulfate, aluminum trihydrate, calcium nitrate, calcium nitrite, calcium chloride, sodium nitrate, thiocyanate or mixtures thereof.

14. 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.

15. 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 of between 500 and 10,000 square meters per cubic meter of the cementitious composition, and mixing said cementitious composition with said formulation until the mixed components form granular material, wherein the at least one aggregate-forming inducer is chosen from shredded and/or cut paper, cardboard, corrugated cardboard, cartons, corrugated cartons, crepe paper, newsprint, kraft paper, wall paper, wax paper, silk paper, shredded currencies removed from circulation, wood fibers, glass fibers, shredded textiles, cotton fibers, hemp, mineral fiber chosen from wollastonite, mica, rock wool, slag wool, graphite, natural fibers chosen from sisal fibers, cotton, flax, jute, coconut husks, protein-based fibers, banana, pineapple, wool, mohair, silk, and mixtures of any of the foregoing.

16. The method of claim 15, wherein said formulation is combined with said cementitious material with a conveyor belt, a pneumatic system, a blower or a dispenser.

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