ence of sulfuric acid to form alkali sulfates in service, thus reducing the durability or the service life.

5989335
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DRY DISPERSION OF PLANT PULP IN CONCRETE AND USE THEREOF

Soroushian, Parviz, Hsu, Jer-Wen
Okemos, Michigan, USA
assigned to Soroushian, Parviz
C04B 1602

Pulp fibers derived from wood or non-wood plants or recycled paper products, which are 0.1–30 mm long and about 0.001–0.1 mm in equivalent diameter, are individualized by mechanical action, blended with at least one of the dry ingredients of the cement-based material and then mixed with the remaining ingredients of conventional cement-based mixtures using conventional mixing equipment for effectively improving fresh and hardened properties of cement-based materials. Dispersion is achieved by individualizing the plant pulp fibers by mechanical action, and further by blending the individualized fibers with at least one of the dry ingredients of the mix and then with the remaining ingredients of the cement-based material, with fibers added at relatively low dosages of about 0.3–30 kg per cubic meter. The affinity of plant pulp fibers for water facilitates their dispersion in conventional cement-based mixtures. Fresh mixtures of cement-based materials incorporating the dispersed individualized plant pulp fibers possess desirable workability, resistance to segregation and bleeding, pumpability, finishability, and reduced rebound when pneumatically applied. Hardened cement-based materials incorporating the dispersed individualized plant pulp fibers provide improved crack resistance, toughness characteristics, impact resistance, fatigue life, abrasion resistance, and other mechanical, physical and durability characteristics. Plain and reinforced concrete and shotcrete as well as precast and cast-in-place concrete, plaster and stucco, mortar, grout and flowable fill are examples of cement-based materials which can benefit from the improvements in fresh and hardened material properties rendered by dispersed plant pulp fibers.

5989336
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CEMENT COMPOSITION

Carpenter, B. Robert, Bloys, J. Benjamin, Johnson, L. David
Allen, Plano, Dallas, Texas, USA
assigned to Atlantic Richfield Company
C04B 1410 E21B 3313

A cement slurry composition suitable for well bore cementation is provided containing as an essential component a synthetic hectorite clay in amount sufficient to reduce free water formation and solids segregation.

5989713
05/09/96
23/11/99

OPTIMIZED GEOMETRIES OF FIBER REINFORCEMENTS OF CEMENT, CERAMIC AND POLYMERIC BASED COMPOSITES

Naaman, E. Antoine,
Ann Arbor, Michigan, USA
assigned to The Regents of the University of Michigan
D02G 300

Fibers, continuous or discontinuous, and bars having optimized geometries for use in the reinforcement of cement, ceramic and polymeric based matrices are claimed. The geometries are designed to increase the ratio of surface area available for bond between the fiber and the matrix to the cross-sectional area of fiber. In the case of a continuous reinforcement comprised of a single fiber or a bar made out of a bundle of fibers, such as is the case in reinforced and prestressed concrete, increasing the surface area available for bond leads to a decrease in crack width, development length, and transfer length. The fibers or bars are also configured to be amenable for twisting or to have spiral like deformations along their longitudinal axis to further develop the mechanical component of bond between the fibers and the matrix. Additional methods of mechanical bond enhancement, such as crimping and/or addition of anchorages, such as hooked ends, paddles, buttons, etc., can be applied to the claimed fibers to further improve their bond characteristics.