

PatentsALERT

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Cement and Concrete Composites

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6070806

SLEEPER

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The sleeper (tie) comprises a body which has a variable cross-section along its length and is made from reinforced polymer concrete with a dispersed reinforcement in the form of steel or synthetic fibres or both the one and the other together, which fibres compose 5–7% of the total mass of the body of the sleeper, are of different lengths and have a different percent of content depending on the type of fibre. At the points of fastening the rails, inserts are provided in the body, the height of the inserts satisfying the relationship: $\frac{2}{3} H_{\text{sub.1}}$ greater than or equal to $H_{\text{sub.2}}$ greater than $\frac{1}{3} H_{\text{sub.1}}$, where $H_{\text{sub.1}}$ is the height of the highest portion at each end of the body of the sleeper, and $H_{\text{sub.2}}$ is the height of the insert. The upper face of the middle part of the body is positioned higher than the lower face of the insert by a value ΔH which is within the limits $0.5 (H_{\text{sub.1}} - H_{\text{sub.2}})$ greater than ΔH greater than $0.1 (H_{\text{sub.1}} - H_{\text{sub.2}})$. Metallic and wooden inserts of various geometric shape are used.

6071436

CORROSION INHIBITORS FOR CEMENT COMPOSITIONS

Michael J. Incorvia,
USA
assigned to GEO Specialty Chemicals Inc.

Compositions and methods relating to cementitious compositions are provided. The addition of an amidoamine that is the reaction product of polyalkylenepolyamines and short-chain alkanedioic acids or reactive derivatives thereof to cementitious compositions has been found useful in inhibiting the corrosion of ferrous metal articles in contact with the said composition. The amidoamine is advantageously employed in combination with a hydrophobe compound that enhances corrosion inhibition. The invention also provides aqueous emulsions which contain the amidoamine, one or more hydrophobes, and an emulsifier for the hydrophobe.

6071613

FIBER REINFORCED CEMENTITIOUS MATERIALS WITH IMPROVED TOUGHNESS AND DUCTILITY

Klaus Alexander Rieder, Neal S. Berke,
USA
assigned to W. R. Grace and Company-Conn.

A hybrid fiber reinforcing system that enhances ductility of concrete at small and large crack openings, while avoiding the

necessity of using steel fibers at high (e.g., 1%) volumes, by taking into account Young's modulus, deploying large surface area to volume ratios for improved anchorage, and using different relative lengths.

6077910

CEMENT RETARDER AND CEMENT RETARDATIVE SHEET

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Japan
assigned to Daicel-Huels Ltd.

A polymer comprising an anionic group (e.g., an acid anhydride group, a carboxyl group) and a hydro-philic segment (e.g., a polyoxyalkylene ether unit) is used as a cement retarder. The polymer is obtainable by copolymerization of a monomer including maleic anhydride with a monomer including a vinylalkyl ether-series monomer in which an alkylene oxide is added to allyl alcohol. The polymer may be a copolymer copolymerized with other monomers such as styrene. Use of this cement retarder can provide patterns or washing-finished face on the surface of a concrete product. The cement retarder is suitable for application for a cement retardative sheet.

6080234

COMPOSITE CONCRETE

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France
assigned to Lafarge Matériaux de Spécialités

An ultra-high performance composite concrete, with low cement and fiber content and having good mechanical properties as well as good impacts, shocks and projectile protection properties, includes hydraulic binder, aggregates, an admixture of metal fibers. Particularly, the composite concrete includes 70–85% of particles (A) having a particle size distribution which ranges from 0.01 to 3 mm up to particle size distribution which ranges from 0.01 to 0.50 mm; 2–10% of particles (B) having particle size of between 0.01 and 1 μm ; 3–20% of hydraulic binder; 0.1–3% of a dispersant or plasticizer; 0.05–8.5% of fibers; and, mixing water, wherein the percentages being weight percentages based on the sum of the weights of constituents (a) to (d).

6083318

LIGHTWEIGHT, WATERPROOF, INSULATING, CEMENTITIOUS COMPOSITIONS AND METHODS FOR FORMING AND USING SUCH COMPOSITIONS

Joseph M. Zawada, Sandra K. Zawada,
USA

A lightweight, cementitious composition and method which includes a noncementitious filler, Portland cement, bentonite, diatomaceous earth and lime. The noncementitious filler may be sawdust, rubber chips, flyash or combinations of two or more of these ingredients. Once mixed with water and air, the composition can be molded to form a variety of structures, including electrically nonconductive posts, and can be used to absorb and contain liquid contaminants in a vessel.

6084011

FREEZE/THAW RESISTANT CEMENTITIOUS ADHESIVE FOR COMPOSITE MATERIALS AND METHOD FOR PRODUCTION THEREOF

Richard F. Lucero, Bruce Davis,
USA

A cementitious paste capable of setting after an interval of time comprises a mixture of a fines component selected from a group consisting of cement and a blend of cement and pozzolonic material, water and a water-soluble polymer that is capable of taking up and releasing water when incorporated into the mixture. The polymer comprises a selected percent by weight of the mixture. A non-foamed cementitious composition is also provided to form a substantially homogeneous, pervious rigid mass that comprises a substantially surfactant-free mixture of the fines component, inert aggregate particles, water and a selected percentage by weight of the water-soluble polymer that is capable of adhesion to the aggregate particles. The fines component, the water and the polymer have proportions with respect to one another and together in a proportion with respect to the aggregate particles sufficient in an absence of surfactant to form a substantially uniform adhesive coating on the aggregate particles such that, upon setting, the aggregate particles are bonded to one another at contact areas thereof. A cementitious powder and a method of forming a substantially homogenous, pervious cementitious rigid body are also provided.

6086349

VARIABLE WALL CONCRETE MOLDING MACHINE

Ernest J. Del Monte,
USA

A portable concrete molding apparatus for forming concrete structures of a predetermined configuration, either on-site or at a central manufacturing facility. The apparatus includes a trailer having furnace plenum bounded by a pair of fixed walls. Each fixed wall cooperates with a movable wall for forming a mold therebetween. Each movable wall includes a

concrete inlet for introducing concrete into the bottom portion of the mold. The fixed and movable walls include push-off valves for ensuring separation of a concrete structure from the mold walls, as the mold walls are separated.

6087418

CEMENT ADMIXTURE AND CEMENT COMPOSITION

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The present invention provides a cement admixture and a cement composition, both of which display little dependence of the water-reducibility upon temperature in that these cement admixture and cement composition involve little slump loss at high temperature and little increase in the amount of addition at low temperature. The cement admixture comprises the following essential components: either or both of polymer (A) and polymer salt (AA), wherein polymer (A) includes constitutional unit (I) of general formula (1) below as an essential constitutional unit, and polymer salt (AA) is obtained by further neutralizing polymer (A) with an alkaline substance; and either or both of polymer (B) and polymer salt (BB), wherein polymer (B) includes constitutional unit (II) of general formula (2) below as an essential constitutional unit, and polymer salt (BB) is obtained by further neutralizing polymer (B) with an alkaline substance.

6099638

CEMENT COMPOSITION FOR MODELING

Carlos Javier Fernandez Garcia,
MX

This invention relates to a cement or cementitious composition with synthetic or natural fibers and/or microfibers with caliber or gauge smaller than 0.0508 mm (2 mils), in a proportion from 0.2% to 1.5% of total weight of composition when dry. Aggregates and additives that achieve thixotropy, plasticity, which preserve its dimensional structure and integral mechanical bonds may also be included. These above ingredients are included to create a composition suitable for modeling (i.e., a petrified material, cement, mortar, or concrete with extraordinary and novel characteristics). This composition is also useful for constructing, machining, restoring or creating forms with or without structures. Furthermore, the composition solidifies without contractions, fissures or cracks.

6103783

ELASTIC WATER-PERMEABLE CONCRETE COMPOSITION, FORMULATION METHOD THEREFOR, ELASTIC WATER-PERMEABLE

CONCRETE STRUCTURE FORMED OF THE COMPOSITION, AND METHOD FOR CONSTRUCTING THE STRUCTURE

Young-keun Hong,
South Korea

An elastic water-permeable polymeric concrete composition, a formulation method therefor, an elastic water-permeable polymeric concrete structure using the composition, and a method for constructing the structure. The polymeric concrete composition is formulated by integrating a rubber powder ground from waste tires or waste rubber and an aggregate using a polymeric binder, and if required, by adding a pigment and aromatic capsules capable of providing remedial and psychological effects. The polymeric concrete structure manufactured using such polymeric concrete composition has appropriate elasticity, water permeability, strength and a pleasant aroma. Thus, the polymeric concrete composition is useful for paving a footpath, a roadway, a bikeway, a railway crossing, a parking lot, a stadium, a racing track, a landing strip, etc., and as a material for civil engineering and constructions such as blocks, tile sound-absorbing plates, soundproofing plates, soundproofing walls and retaining walls.

6105430

INSPECTION OF CONCRETE STRUCTURES USING SONIC TOMOGRAPHY

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USA
assigned to The United States of America as represented by the Secretary of the Interior

An acoustic travel time tomography system enables determining of physical properties of a dam, or a like concrete mass. The system includes a plurality of acoustic sensors, positioned on the dam at a plurality of spaced sensor locations which are known relative to each other, for producing output data responsive to the detection thereby of acoustic waves generated in the dam. An impact source produces an impact at an impact location which is known relative to the sensor locations so as to generate acoustic waves in the dam for detection by the sensors. A data processing unit acquires output data from the sensors produced responsive to acoustic waves generated by the impact source and analyzes this output data, together with data related to the relative locations of the sensors and the impact source, to determine physical properties of the dam.

6110270

METHOD FOR INFLUENCING MOISTURE CONTENT AND MIGRATION IN BUILDING MATERIALS

Thomas Beckenhauer,
USA

The moisture content within, and moisture flow in and out of, porous building materials such as masonry, brick, concrete, and mortar, can be affected by coating the building material with polyvinyl alcohol, or by incorporating polyvinyl alcohol into the building material. The resultant control of moisture movement can influence the suction of the building material, leading to improved bonding with adjacent building material, and can also retard efflorescence.

6110271

METHODS FOR IMPROVED RHEOLOGICAL CONTROL IN CEMENTITIOUS SYSTEMS

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Great Britain
assigned to Pharmacia Corporation

In accordance with the present invention, a microbial polysaccharide having the features characteristic of S-657 has been found to be effective to improve the rheological properties of a variety of cementitious systems. Thus, the addition of a small, but effective amount of S-657 to such cementitious systems as portland cement, self-leveling grouts, fresh or saltwater oil well cement slurries, microfine cements and the like, gives rise to substantial improvements in such properties as bleed, flow resistance, fluid loss control, and the like. S-657 addition provides enhanced rheological control in a variety of cementitious systems. In addition, S-657 provides a number of advantages relative to prior art systems, including improved free water and sedimentation control, as well as reduced fines loss during underwater placement. This unique biogum has been shown to enhance the stability of highly diluted microfine cementitious systems, and enhance the flow and workability of superworkable and self-leveling pastes. The homogenous set cement resulting from the introduction of S-657 into cementitious systems promotes bond strength and eliminates the need for vibrated concrete. Efficient free or bleed water control eliminates unsightly vugs or voids adjacent to the form work and thus enhances the appearance of the finished concrete. This highly efficient polymer provides additional benefits as well, such as, for example, enhanced color delivery in pigmented concrete and stabilized bubble entrapment in so called foamed or cellular cement systems. When used in sprayable cementitious systems, S-657 reduces rebound and sag.

6113684

RAPID HARDENING, ULTRA-HIGH EARLY STRENGTH PORTLAND-TYPE CEMENT COMPOSITIONS, NOVEL CLINKERS AND METHODS FOR THEIR MANUFACTURE WHICH REDUCE HARMFUL GASEOUS EMISSIONS

Hassan Kunbargi,
USA

Clinkered materials containing high concentrations of $\{(C,K,N,M).sub.4 (A,F,Mn,P,T,S).sub.3 Cl,S)\}$ (crystal X), and $\{C.sub.2 S).sub.3 (CS).sub.3 C(f,Cl)\}$ or $C.sub.10 S.sub.3 S.sub.3 (f,cl)$ (crystal Y), and/or $\{C.sub.5 S.sub.2 S)\}$ (crystal Z) directly from the kiln, rapidly hardening ultra-high early strength cement including these clinkered materials, methods for forming and using said compositions and the cements so produced are claimed. The methods include the steps of forming a mixture of raw material containing $CaO, MgO, Al.sub.2 O.sub.3, Fe.sub.2 O.sub.3, TiO.sub.2, Mn.sub.2 O.sub.5, SiO.sub.2, SO.sub.3, Na.sub.2 O, K.sub.2 O, P.sub.2 O.sub.5$ and F, respectively designated C, M, A, F, T, Mn, S, S, N, K, P and f, and heating said mixture to an elevated temperature between 900°C and 1200°C; before determining average amount of crystals X, Y, and Z. Final mixtures comprising these clinkers and hydraulic or portland type cement are made to produce cement compositions having crystal X concentrations of approximately 5–35% by weight, crystal Y concentrations of approximately 5–40% by weight, and/or crystal Z concentrations of approximately 5–40% by weight, with the remainder being hydraulic or portland type cement. The cements so produced are rapid hardening and exhibit high strengths ranging from 2000 to 7000 psi in one hour, 6000 to 8000 psi in one day and 9000 to 12,000 psi in 28 days. They are sulfate and sea-water attack resistant and have low heats of hydration, minimal shrinkage, and high water impermeability. The methods claimed also results in significant reduction in gaseous emissions including $SO.sub.x, NO.sub.x$ and $CO.sub.x$.

6117226

STABLE SUSPENSION OF HYDROCOLLOIDS

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USA
assigned to Pharmacia Corporation

The present invention comprises a stable hydrocolloid composition in which a hydrocolloid, preferably welan gum, is uniformly dispersed in a superplasticizer such as sulfonated naphthalene, sulfonated melamine, modified lignosulfate, their derivatives and mixtures thereof. This is then dispersed in a rheological control agent which is a microbially produced cellulose fiber composition. The welan gum is rapidly hydratable and useful as a stabilizing additive in many cement and drilling fluid applications, insulation fluids and de-icer compositions.

6123485

PRE-STRESSED FRP-CONCRETE COMPOSITE STRUCTURAL MEMBERS

Amir Mirmiran, Mohsen Shahawy,
USA
assigned to University of Central Florida

Fiber reinforced plastic FRP formed about concrete piles and columns. The FRP components generally include an exterior shell and an interior protruding portions. The concrete filled FRP tubes are enhanced by pre-stressing the concrete core, thereby increasing the bond with the tube and placing the tube in an active hoop tension. The pre-stressing can be developed by either post-tensioning a series of strands (or tendons) that are placed inside the core, or by using expansive core materials which do expand upon curing and will therefore impose an active pressure on the confining tube. The bond can be developed by either internal resin grids, FRP spirals, FRP orthotropic grids, sand-resin coating, bonding agent or protruded ribs. The system can be used as a fender pile, bearing pile, bridge pier column, or any structural column. The system can be made by pultrusion, SCRIMP, REM, centrifugal methods or hand lay-up. The invention can additionally enhance the compressive, flexural and shear strengths of concrete support columns and piles especially for infrastructures such as bridges, buildings and the like used in hurricane and seismic zone locations.

6123879

METHOD OF REINFORCING A CONCRETE STRUCTURE

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USA
assigned to Hexcel CS Corporation

A structural member for reinforcement of asphalt and concrete roadways and other products, and which includes a gridwork of warp strands and weft strands which are disposed at right angles to each other and so as to define an open structure. In one embodiment, the gridwork is impregnated with a thermosettable B-stage resin so as to interlock the strands at their crossover points and maintain the gridwork in a semi-flexible state, and after being applied to the product to be reinforced, the resin is heated to convert the same into a fully cured composite to thereby rigidize the gridwork and reinforce the product. In cases where the product to be reinforced is heated, such as asphalt paving, the heat of the product provides the heat necessary to fully cure the resin in situ. In another embodiment, the resin is fully cured to rigidize the gridwork prior to its being applied to the structure to be reinforced. A method of producing the resin impregnated gridwork is also disclosed.