Claims:

~~1. A cementitious composite product for use as a lumber substitute, the product comprising:~~

~~a cured cementitious composition comprised of a hydraulic cement, a rheology modifying agent, and fibers substantially homogeneously distributed through the cured cementitious composition and included in an amount greater than about 10% by dry volume of the cured cementitious composition, said cured cementitious composition characterized by a flexural strength of from about 1500 psi to about 5000 psi (from about 105.5 kgf/cm^2 to about 351.5 kgf/cm^2) and a density less than about 1.3 g/cm^3.~~

~~2. The cementitious composite product as set forth in claim 1, further comprising at least one reinforcing member selected from the group consisting of rebar, wire, mesh, and fabric at least partially encapsulated by the cementitious composition.~~

~~3. The cementitious composite product as set forth in claim 2, wherein the reinforcing member is bonded to the cementitious composition by a bonding agent.~~

~~4. The cementitious composite product as set forth in claim 1, wherein the fibers are included in an amount greater than about 15% by dry volume of the cementitious composition.~~

~~5. The cementitious composite product as set forth in claim 1, wherein the fibers are included in an amount greater than about 20% by dry volume of the cementitious composition.~~

~~6. The cementitious composite product as set forth in claim 1 being a building product that is a substitute for a lumber building product.~~

~~7. The cementitious composite product as set forth in claim 1, wherein the ratio of flexural strength to compressive strength of the product is greater than 1:1.~~

~~8. The cementitious composite product as set forth in claim 1, wherein the cementitious composition is sawable using a standard wood saw.~~

~~9. The cementitious composite product as set forth in claim 6, wherein the building product is in a shape selected from the group consisting of a rod, bar, pipe, cylinder, board, I-beam, utility pole, trim board, two-by-four, structural board, one-by-eight, panel, flat sheet, roofing tile, and a board having a hollow interior.~~

~~10. The cementitious composite product as set forth in claim 6, wherein the building product is capable of receiving a 10d nail by being hammered therein with a hand hammer without significant bending.~~

~~11. The cementitious composite product as set forth in claim 6, wherein the building product has a nail pullout resistance of at least about 50 lbf/in for a 10d nail.~~

~~12. The cementitious composite product as set forth in claim 6, wherein the building product has a screw pullout resistance of at least about 500 lbf/in.~~

~~13. The cementitious composite product as set forth in claim 1, characterized by at least one of the following:~~

~~the fibers being selected from the group consisting of hemp fibers, cotton fibers, plant leaf or stem fibers, hardwood fibers, softwood fibers, glass fibers, graphite fibers,~~

~~silica fibers, ceramic fibers, metal fibers, polymer fibers, polypropylene fibers, carbon fibers, and combinations thereof;~~

~~the hydraulic cement being selected from the group consisting of Portland cements, MDF cements, DSP cements, Densit-type cements, Pyrament-type cements, calcium aluminate cements, plasters, silicate cements, gypsum cements, phosphate cements, high alumina cements, micro-fine cements, slag cements, magnesium oxychioride cements and combinations thereof;~~

~~the rheology modifying agent being selected from the group consisting of is polysaccharides, proteins, celluloses, starches, methylhydroxyethylcellulose, hydroxymethylethylcellulose, carboxymethylcellulose, methylcellulose, ethylcellulose, hydroxyethylcellulose, hydroxypropylcellulose, amylpectin, amulose, seagel, starch acetates, starch hydroxyethers, ionic starches, long chain alkylstarches, dextrins, amine starches, phosphate starches, dialdehyde starches, clay, and combinations thereof;~~

~~including a set accelerator selected from the group consisting of KCO_3, KOH, NaOH, $CaCl_2$, CO_2, magnesium chloride, triethanolamine, aluminates, inorganic salts of HCl, inorganic salts of HNO_3, inorganic salts of H_2SO_4, and combinations thereof; or~~

~~including a filler material selected from the group consisting of sand, dolomite, gravel, rock, basalt, granite, sandstone, glass beads, aerogels, xerogels, seagel, mica, clay, synthetic clay, alumina, silica, fly ash, silica fume, tabular alumina, kaolin, glass microspheres, ceramic spheres, gypsum dihydrate, calcium carbonate, calcium aluminate, and combinations thereof.~~

1~~1~~4. A method of manufacturing a cementitious composite product having properties suitable for use as a substitute for wood lumber, comprising:

mixing together water, fibers and a rheology-modifying agent to form a fibrous mixture in which the fibers are substantially homogeneously dispersed;

adding hydraulic cement to the fibrous mixture to yield an extrudable cementitious composition having a plastic consistency and which includes the rheology-modifying agent

at a concentration from about 0.1% to about 10% by wet volume, and fibers at a concentration greater than about 5% by wet volume;

extruding the extrudable cementitious composition into a green intermediate extrudate having a predefined cross-sectional area, the green extrudate being form-stable upon extrusion and capable of retaining substantially the cross-sectional area so as to permit handling without breakage;

heating the green extrudate to a temperature of from greater than 65°C to less than 99°C to allow curing of the hydraulic cement.

2~~15~~. The method as set forth in claim 1~~14~~, wherein the green extrudate is heated to a temperature of greater than about 70°C to less than 99°C to remove a portion of the water by evaporation and reduce the density of the extrudate.

3. The method as set forth in Claim 1, wherein the green extrudate is heated to a temperature of greater than 80°C to less than 99°C to remove a portion of the water by evaporation and reduce the density of the extrudate.

4. The method as set forth in Claim 1, wherein the cementitious composition has at least 100% of its strength within 48 hours.

5. The method as set forth in Claim 1, wherein the cementitious composition has at least 100% of its strength within 40 hours.

6. The method as set forth in Claim 1, wherein the cementitious composition has at least 100% of its strength within 24 hours.

7~~16~~. The method as set forth in claim 1~~14~~, wherein the fibers are included in an amount greater than about 7% by wet volume of the extrudable cementitious composition.

8~~17~~. The method as set forth in claim 1~~14~~, wherein the fibers are included in an amount greater than about 8% by wet volume of the extrudable cementitious composition.

9~~18~~. The method as set forth in claim 2~~15~~, wherein the extrudable composition has a nominal water/cement ratio greater than about 0.75 prior to heating and an actual water/cement ratio less than about 0.5 after evaporation of the portion of water.

10~~19~~. The method as set forth in claim 1~~14~~, further comprising extruding the extrudable cementitious composition around at least one reinforcing member selected from the group consisting of rebar, wire, mesh, and fabric so as to at least partially encapsulate the reinforcing member within the green extrudate.

11~~20~~. The method as set forth in claim 10~~19~~, further comprising:

extruding a green extrudate having at least one continuous hole that is form-stable;

inserting a rebar and a bonding agent into the continuous hole while the cementitious composite is in a form-stable green state or is at least partially cured; and

bonding the rebar to a surface of the continuous hole with the bonding agent.

12~~21~~. The method as set forth in claim 1~~14~~, further comprising configuring the cementitious composite into trim board.

13~~22~~. The method as set forth in claim 1~~14~~, further comprising processing the cementitious composite into a building product so as to be a substitute for a lumber building product having a shape selected from the group consisting of a rod, bar, pipe, cylinder, board, I-beam, utility pole, trim board, two-by-four, structural board, one-by-eight, panel, flat sheet, roofing tile, and a board having a hollow interior.

14~~23~~. The method as set forth in claim 1~~14~~, further comprising processing the form stable green extrudate and/or cured cementitious composite by at least one process selected from the group consisting of bending, cutting, sawing, sanding, milling, texturizing, planing, polishing, buffing, pre-drilling holes, painting, and staining.

15~~24~~. The method as set forth in claim 1~~14~~, further comprising recycling a portion of a scrap green extrudate obtained from the processing the green extrudate, wherein the recycling includes combining the scrap green extrudate with the extrudable cementitious composition.

16~~25~~. The method as set forth in claim 1~~14~~, wherein the cementitious composition is extruded through a die opening and/or by means of roller-extrusion.

17~~26~~. The method as set forth in claim 1~~14~~, further comprising die stamping or impact molding the green intermediate extrudate.

18~~27~~. A cementitious composite product for use as a lumber substitute, the product comprising:

a cured cementitious composition comprised of a hydraulic cement, a rheology modifying agent, and fibers substantially homogeneously distributed through the cured cementitious composition and included in an amount greater than about 10% by dry volume of the cured cementitious composition, said cured cementitious composition characterized by a flexural strength of ~~-~~from about 1500 psi to about 5000 psi (from about 105.5 kgf/cm^2 to about 351.5 kgf/cm^2), and prepared by a process comprising:

mixing together water, fibers and a rheology-modifying agent to form a fibrous mixture in which the fibers are substantially homogeneously dispersed;

adding hydraulic cement to the fibrous mixture to yield an extrudable cementitious composition wherein the extrudable cementitious composition has a plastic consistency and

which includes the rheology-modifying agent at a concentration from 0.1 % to 10% by wet volume, and fibers at a concentration greater than 5% by wet volume;

extruding the extrudable cementitious composition into a green intermediate extrudate having a predefined cross-sectional area, the green extrudate being form-stable upon extrusion and capable of retaining substantially the cross-sectional area so as to permit handling without breakage;

heating the green extrudate to a temperature of from greater than 65°C to less than 99°C to allow curing of the hydraulic cement.

19~~28~~. The cementitious composite product as set forth in claim 18~~27~~, wherein the hydraulic cement is cured by heating the green extrude to a temperature of greater than about 70°C to less than 99°C to remove a portion of the water by evaporation and reduce the density of the extrudate.

20~~29~~. The cementitious composite product as set forth in claim 19~~28~~, wherein the extrudable composition has a nominal water/cement ratio greater than about 0.75 prior to heating and an actual water/cement ratio less than about 0.5 after evaporation of the portion of water.

21~~30~~. The cementitious composite product as set forth in claim 18~~27~~, wherein the cementitious composition has a density less than about 1.3 g/cm^3.

22~~31~~. The cementitious composite product as set forth m claim 18~~27~~, further comprising at least one reinforcing member selected from the group consisting of rebar, wire, mesh, and fabric at least partially encapsulated by the cementitious composition.

23~~32~~. The cementitious composite product as set forth in claim 22~~31~~, wherein the reinforcing member is bonded to the cementitious composition by a bonding agent.

2433. The cementitious composite product as set forth in claim 1827 being a building product that is a substitute for a lumber building product.

~~34. The cementitious composite product as set forth in claim 27, wherein the extrudable cementitious composition comprises fibers at a concentration greater than about 5% by wet volume.~~

2535. The cementitious composite product as set forth in claim 1827, wherein the extrudable cementitious composition comprises fibers at a concentration greater than about 7% by wet volume.

2636. The cementitious composite product as set forth in claim 1827, wherein the extrudable cementitious composition comprises fibers at a concentration greater than about 8% by wet volume.