
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: CEMENTITIOUS BOARDS WITH REINFORCED EDGES THAT RESIST IMPACT DAMAGE

(57) Abstract: A cementitious board reinforced on its edges by a coating of an elastic composition that provides improved nail pull strength to the board. In a preferred embodiment, the coating provides additional protection of the edges of the board from impact damage and cracking or 'pulling' of the board during handling and installation e.g. nailing, particularly when the board is nailed to a structure near the edges of the cementitious board. The cementitious board typically include gypsum fiberboard, paper covered gypsum wallboard and cement board having a core layer of a lightweight cement composition. On the edges of the board, the coating is applied to cover the portion of the board from the edge to a distance of about 0.635 cm. to 5.08 cm. (one fourth inch to two inch) typically 0.635 cm. to 2.54 cm. (one fourth inch to one inch) from each of the edges on both the top and bottom outer surface layers of the cementitious board to form rounded edges.
Published:
— without international search report and to be republished
upon receipt of that report
CEMENTITIOUS BOARDS WITH REINFORCED EDGES THAT RESIST IMPACT DAMAGE

FIELD OF THE INVENTION

CROSS REFERENCE TO RELATED APPLICATION

[001] This application claims priority from United States Provisional Application No. 61/017,343, filed December 28, 2007, incorporated herein by reference in its entirety.

[002] The present invention relates generally to cementitious panels or boards, including cement board, gypsum board, cement fiberboard, gypsum cellulose fiberboard (gypsum fiberboard) wherein the cementitious board is reinforced on its edges by a coating of an elastic composition unaffected by alkali attack. The present invention generally prevents damage from transportation, moving or nailing during installation.

BACKGROUND OF THE INVENTION

[003] The use of reinforced cement panels is well known in industries such as the ceramic tile industry. Generally, cement panels or boards contain a core formed of a cementitious material which may be interposed between two layers of facing material. The facing materials employed typically share the features of high strength, high modulus of elasticity, and light weight to contribute flexural and impact strength to the high compressive strength, but brittle material forming the cementitious core. Typically, the facing material employed with cement panels is fiberglass fibers or fiberglass mesh that is embedded in the cementitious slurry core. Fiberglass performs particularly well in this application. Fiberglass provides greater physical and mechanical properties to the cement board. Fiberglass is also an efficient material to reinforce the cement panels because of its relatively low cost when compared with other high modulus materials.

[004] Cementitious backerboard comprises a panel having a core layer of light-weight concrete with each of the two faces covered with a layer of
reinforcing fabric bonded to the core layer. Such cementitious backerboards are described in the U.S. Pat. No. 3,284,980 P. E. Dinkel, which is incorporated herein by reference in its entirety. These panels are nailable and

[005] are readily fastened to the framing members. Furthermore they are substantially unaffected by water and consequently find extensive use in wet areas such as shower enclosures, bathtub surrounds, kitchen areas and entryways, as well as on building exteriors.

[006] Cementitious backerboards are generally produced using a core mix of water, light-weight aggregate (e.g., expanded clay, expanded slag, expanded shale, perlite, expanded glass beads, polystyrene beads, and the like) and a cementitious material (e.g., Portland cement, magnesia cement, alumina cement, gypsum and blends of such materials). A foaming agent as well as other additives can be added to the mix.

[007] The reinforcing fabric most generally employed is a fiber glass scrim and, in particular, is a woven mesh of vinyl coated fiber glass yarns. The yarn count per 2.54 centimeter (1 inch) of the fabric varies from 8x8 to 12x20, depending upon the size of the openings in the mesh or scrim for passage of the bonding material through the fabric. Other pervious fabrics having suitable tensile strength, alkali resistance and sufficiently large pores or openings may be employed.

[008] Commonly the reinforcing fabric is bonded to the surface of the core layer with a thin coating of Portland cement slurry, with or without some fine aggregate added. Alternatively, the core mix can be sufficiently fluid to be vibrated or forced through the openings of the reinforcing fabric to cover the fabric and to bond it to the core layer. This is described in U.S. Pat. No. 4,450,022 of Galer, the disclosure of which is incorporated herein by reference in its entirety.

[009] Other methods of manufacture of cement boards are disclosed in U.S. Pat. No. 4,203,788 to Clear, which discloses a method and apparatus for
producing fabric reinforced tile backerboard panel; U.S. Pat. No. 4,488,909 to Galer et al., describes in further detail, in column 4, the cementitious composition used in a cementitious backerboard; U.S. Pat. No. 4,504,335 to Galer discloses a modified method for producing fabric reinforced cementitious backerboard; and U.S. Pat. No. 4,916,004 to Ensminger et al. describes a reinforced cementitious panel in which the reinforcement wraps the edges and is embedded in the core mix. The disclosures of all of the above listed US Patents are incorporated herein by reference in their entirety.

[0010] Fiberglass, however, has a major disadvantage. It lacks resistance to chemical attack from the ingredients of the cements. Common cements, such as Portland cement, provide an alkaline environment when in contact with water, and the fiberglass yarn used in reinforcement fabrics is degraded in these highly alkaline conditions. To overcome this problem, protective polymeric coatings, such as polyvinyl chloride solution coatings, are applied to the fiberglass. Although these coatings reduce fiberglass degradation, the integrity of the protective coating on the fiberglass yarns is critical to the success of the concrete panel. Furthermore, the fiberglass rapidly degrades with heat, which typically occurs during the curing of the cementitious boards. Therefore, excess fiberglass must be included to ensure a minimum amount of strength over the life of the cement boards.

[0011] Efforts have been made to reinforce wall board through use of fabric reinforcement secured in position to the surface of the board with an adhesive as in US Patent 1,747,339 A to Walper, incorporated herein by reference, in which the fabric reinforced wall board is also coated with water-proof or moisture resistant material to protect the edges of the board against moisture.

[0012] In US Patent 6,187,409 B1 to Mathieu, incorporated herein by reference, cementitious panel is reinforced with a fabric at its surface and the longitudinal edges are reinforced with a network of fibers. A continuous band of synthetic alkali-resistant, non-woven fabric completely covers the edge areas of the board with a U-shaped reinforcing mesh to make the edges resistant to impact.
[0013] US published application US2004/0219845 to Graham, incorporated herein by reference, has also proposed to use a carbon fiber fabric to form a scrim that wraps the board and its edges and is bonded to the board surface with an adhesive such as polyvinyl alcohol, acrylic, polyvinyl acetate, polyvinyl chloride, polyvinylidene chloride, polyacrylate, acrylic latex or styrene butadiene rubber, plastisol, etc.

[0014] It has also been proposed to harden the edges of gypsum plaster board by mixing the gypsum with a sulphite cellulose, pitch, gum Arabic or other similar colloidal gum to form a plastic mass that is diverted to the six to nine inches of board along the board edge and allowed to harden/set and dry out to form a toughened gypsum plastic mass.

[0015] US Patent 3,832,250 A to Pearson, incorporated herein by reference, also sought to form gypsum board with hardened edges using a “semifluid gypsum mud or paste” impregnated with an aqueous corn syrup solution.

[0016] Accordingly, there remains a need for an improved cementitious panel e.g. a cement panel that is reinforced on its edges without the need for the use of reinforcing fabric scrim or non-woven fabric layers on the edges of the cement panels as commonly used in some commercial cement panel.

SUMMARY OF THE INVENTION
[0017] The present invention relates to a new and improved cementitious panels such as cement board, gypsum board, gypsum cellulose fiber board, etc. that is reinforced from damage on its edges by an elastic coating composition applied to each of the edges of the cement panel. The cementitious panel includes a core layer made of a cement composition and typically has reinforcing fiberglass mesh or scrim on the opposing surfaces of the cement core that is embedded into the cementitious core. The fiberglass mesh or scrim is commonly treated with a polyvinyl chloride thermal melt coating to resist degradation under alkaline conditions. In the case of cement boards, the bottom scrim or mesh layer is commonly extended over the panel
edge and overlap at least a portion of the top mesh or scrim to which it is adhesively attached. In one embodiment, the elastic coating can be applied over the scrim on both of the opposed surfaces of the core and over scrim that extends over the edges of the cement panel.

[0018] As commonly used in the cementitious panel art, the term "scrim" means a fabric having an open construction used as a base fabric or a reinforcing fabric. In a triaxial scrim, plural weft yarns having both an upward diagonal slope and a downward diagonal slope are located between plural longitudinal warp yarns located on top of the weft yarns and below the weft yarns.

[0019] In another embodiment, the scrim or mesh layer embedded into the surfaces of the cementitious core and the edge can also be wrapped with a paper layer that extends over the scrim or mesh layer and the edge of the panel to a portion of the top mesh layer. In accordance with the instant invention, the border edge regions of the cement panels, including the cement core and mesh layers and any overlapping paper layer are coated with the elastic coating to strengthen the edges and prevent impact damage to the edge during nailing near the edge of the panel.

[0020] In another embodiment, the cementitious panel such as a gypsum wood fiberboard, can be adequately protected with only the coating of the current invention without the use of a fabric or mesh held to the edges of the cement core by an adhesive composition in accordance with standard industry practices.

[0021] In another embodiment, a cementitious panel such as gypsum board which has a paper layer on both surfaces of the gypsum core can be protected from spalling or impact damage by coating the longitudinal edges of the gypsum board with the elastomer coating with or without a layer of paper over the edges.
[0022] Other features and advantages of the present invention will be apparent to those skilled in the art from the Detailed Description of the Preferred Embodiments presented below and accompanied by the drawings.

BRIEF DESCRIPTION OF THE DRAWING

[0023] FIG. 1 is a perspective view of a cement panel coated on both edges with an elastic material to protect the edges from damage in accordance with an embodiment of the present invention.

[0024] FIG. 2 is a side view along view II-II of the cement panel with a layer of embedded scrim or mesh wrapped around the edges and the scrim layer embedded in the core on the opposing side of the cement core and coated by an elastic material coating in accordance with the embodiment of FIG. 1.

[0025] FIG. 3 shows the coating also applied to the opposed side edges of the board.

[0026] FIG. 4 shows a side view of another embodiment in which the back scrim or mesh layer and the edge can also be wrapped with a paper layer that extends over the back mesh and the edge of the panel to a portion of the front mesh layer.

[0027] FIG. 5 shows another embodiment of the present invention in which, the cement board can be adequately protected with only the coating of the current invention without the use of a fabric or mesh held to the edges of the cement core by an adhesive composition.

[0028] FIG. 6 is a side cross sectional view of a conventional cement board.

[0029] FIG. 7 is a cross sectional view of a cement board of the present invention
[0030] FIG. 8 is a photograph of a conventional cement panel nailed to a wooden frame with a major spalling failure near the edges.

[0031] FIG. 9 is a photograph of a cement panel coated on its edge with the elastic coating in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0032] The present invention is a new and improved cement panel reinforced on one or more of its edges with a coating of an elastic material.

[0033] FIG. 1 is a perspective view of a cement board 10 having a cement core 12 and scrim wrapped about the core 12, and a coating of an elastic material 20 on opposed top and bottom edges 19, 21 in accordance with an embodiment of the present invention. Elastic material 20 protects the edges 19, 21 from damage. The core layer 12 is made of a cement composition. The polyvinyl chloride coated reinforcing fiberglass mesh or scrim is wrapped about the core 12 to form a front layer 11 and a back layer 13. The back scrim or mesh layer 13 is commonly extended to its edge 27 over the panel edge 19 and overlaps at least a portion of the front mesh or scrim 11 and is embedded in the cement core 12.

[0034] As commonly used in the cement panel art, the term "scrim" means a fabric having an open construction used as a base fabric or a reinforcing fabric. In a triaxial scrim, plural weft yarns having both an upward diagonal slope and a downward diagonal slope are located between plural longitudinal warp yarns located on top of the weft yarns and below the weft yarns.

[0035] FIG. 2 is a side view of the cement board 10. As shown in FIG. 1, the cement board 10 includes a core layer 12 made of a concrete composition. Core layer 12 is covered by top layer 11 and bottom layer 13 made of fiberglass scrim or mesh.

[0036] The edges 21 of the core layer 12, and end portions of the scrim front layer 11 and back layer 13 are wrapped to produce rounded edge corners 22.
Because of its cementitious nature, a cement board or panel may have a tendency to be relatively brittle at its edges which often serve as points of attachment for the boards. Using the selected elastic polymer 20 to coat the edge 21 of the cement board 10 and the portions of the front and back scrim faces adjacent these edges gives elasticity to the opposed end portions of the board 10. Typically the coated end portions extend a distance "A" of about 0.635 to 7.62 cm. (0.25 to 3.0 inches) typically about 0.635 cm to 2.54 cm (0.25 to 1.0 in.) from each of the respective edge 21, as shown in FIG. 2 with the coated edges 20 extending over a portion of the front scrim layer 11 and the back scrim layer 13.

[0037] By coating the edge 21, the strength of the cement board edges is augmented. Coatings are typically applied in two or three coats.

[0038] Cementitious boards are generally used as a substrate for ceramic tile and coatings used must be compatible with this application. ANSI specifications 118.10 and 118.12 outline product performance for Waterproofing and Crack isolation used in conjunction with ceramic tiles. Coatings meeting the tile bonding performance requirements of these ANSI specifications are regarded as suitable for this invention.

[0039] Elasticity or elongation is measured in the coatings industry using ASTM D522-93a (effective 2001). This is a standard test method for mandrel bend test of attached organic coatings wherein the measure of the coating independent of the substrate.

[0040] If desired the coating 20 may also be applied to the opposed side edges 31, 33 as shown in FIG. 3.

[0041] FIG. 4 shows another embodiment of a panel 40 in which the bottom scrim or mesh layer and the edge can also be wrapped with a paper layer 29 that extends over the bottom mesh and the edge of the panel to a portion of the top mesh layer. In accordance with the instant invention, the border edge regions of the cement panels, including the cement core and mesh layers and
any overlapping paper layer are coated with the elastic coating to strengthen the edges and prevent impact damage to the edge during nailing near the edge of the panel.

[0042] If desired the coating may be applied such that the boards retain sufficient structural integrity during handling and attachment without the need for use of a reinforcing fabric layer or scrim, such as in the case of cement fiber board or gypsum wood fiber board.

[0043] Thus, FIG. 5 shows another embodiment of a panel 50 of the present invention in which, the cement board can be adequately protected with only the coating 20 of the current invention without the use of a fabric or mesh held to the edges of the cement core by an adhesive composition.

[0044] The elastic coating 20 may be applied by spraying, pouring, sprinkling, dipping, and painting onto the edges and is then dried after application so as to stabilize reinforcement of the edges of the cement board from damage or spalling.

[0045] The coated edges of the cement board also have the advantage of producing a curved or rounded edge on the cement board, which improves handling of the board during transportation and installation.

COATING MATERIAL

[0046] In the preferred embodiment, the elastomeric coating is applied by spraying on the coating approximately 7.84 cm. (3 inch) from each edge and allowed to dry to a uniform smooth surface over the top and bottom layers 11 of the cement board 10. It is contemplated that the coating will range from about 2 to 3 mm in thickness over the surface of the outer layers and taper off into the central portion of the cement board 10.

[0047] As previously discussed, the elimination of the need for reinforcing fibers on the edges of the cement board is a particular advantage of the instant invention. The use of fibers can obvious be used if desired to provide
further reinforcement of the cement board surfaces, but wrapping of multiple layers of fiber over the edges of the cement board as used by some commercial suppliers of cement board is unnecessary.

[0048] In a typical embodiment, the elastomer coating is a latex rubber composition that has the desired elasticity as measured by its percent elongation of about 100% to about 1000% such as found in natural rubber,

[0049] Commercially available elastomers that can be used typically have an elastic elongation of from 500% to 1000%. The elastomers more typically have an elongation in the range of about 400% to about 600% and which typically also provides a water resistant property to the coated edges of the cement board panel.

[0050] Elastomers can include co-polymers of rubber and at least one other alpha-olefin and/or terpolymers rubber of ethylene at least one other alpha-olefin, and a minor proportion of at least one other alpha-olefin, and a minor proportion of at least one co-polymerizable polyene.

[0051] The copolymer rubber is preferably a styrene copolymer e.g. styrene-butadiene copolymer. Such copolymer may be the only rubber in the elastomer material, but typically, the elastomeric material comprises a blend of the copolymer.

[0052] Coating compositions that have been found to have the necessary degree of elasticity include polyisoprene, polybutadiene, polyisobutylene and liquid forms of natural rubbers. A liquid rubber product with a high elongation and which adheres to cement board and thin coat mortars and basecoats have been found to be particularly effective.

[0053] A typical coating composition that has been found to give good results is a liquid rubber product that is sold under the tradename LATICRETE® Watertight Floor N' Wall Waterproofing, made by Laticrete International, Inc., Laticrete Park North, Bethany, CT 06524. This liquid rubber product is
ordinarily used to protect substrates like concrete gypsum wallboard plywood cement backer board and gypsum plaster that are used under ceramic tile and stone in wet areas, such as bathrooms. The liquid rubber has a reported elongation of 400% and a tensile strength of 5.3 MPa (765 psi.).

[0054] FIG. 6 illustrates a schematic partial side view of a conventional DUROCK® brand cement board 60 available from USG Corporation, Chicago, IL 60661. Board 60 has a core 12, fiberglass scrim providing a front fiberglass scrim layer 11 and back fiberglass scrim layer 13, and a paper layer 35.

[0055] The protection obtained by the instant coating of the edges of cement panels with the elastic coating of this invention is shown in the following examples.

EXAMPLES

Example 1

[0056] FIG. 7 shows a modified board 70 in which LATICRETE® Watertight liquid rubber product commercially available from Laticrete International Inc., Bethany CT 06524 with an elongation specification of 400% was painted as a coating 20 on the edges of several sample of USG Corporation's DUROCK® brand cement board to produce a board structure, having the liquid rubber coating wrapped around the wrapped edges of the cement board for 0.635 to 2.54 cm. (¼ in. to 1 in.) in a longitudinal direction.

[0057] Upon drying, the cured coated cement board samples 70 were subjected to high impact nailing and the spalled material was also held in place even when the board was nailed near the edge of the board. The boards were visually examined and no cracking (spalling) was observed that would lead to detachment of the nailed board from the structure.
[0058] Spalling is the chipping or flaking of concrete, bricks, or other masonry which is typically found when there is improper drainage or venting and freeze/thaw cycling exists. A typical example of spalling in a nailed cement panel that has not been coated with the protective elastic coating of the invention is shown in the photograph in FIG. 8.

[0059] In contrast, a cement board 70 in FIG. 9 has a protective elastic coating 20, of Example 1, on its edge of its longitudinal front surface 11 and the back surface 13 (not shown in FIG. 9) and is resistant to spalling when nailed on the top and bottom edges of longitudinal front surface 11 of the board.

[0060] Specific examples of typical elastic coatings that would be effective in the current cement panel are listed in Table 1:

<table>
<thead>
<tr>
<th>Type Of Elastic Coating</th>
<th>Brand name</th>
<th>Supplier</th>
<th>Elongation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control – No Coating</td>
<td>Not Applicable</td>
<td></td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Acrylic Latex Flat Paint</td>
<td>ACE Brand Flat Paint</td>
<td>ACE Hardware Stores</td>
<td>&lt; 100</td>
</tr>
<tr>
<td>Acrylic Latex Enamel paint</td>
<td>ACE Brand Semi-Gloss Paint</td>
<td>ACE Hardware Stores</td>
<td>&lt; 100</td>
</tr>
<tr>
<td>Rubberized plastic roof coating</td>
<td>Snow Roofing System® Premium White Roof Coating</td>
<td>Snow Roofing System® available from ACE Hardware Stores.</td>
<td>500</td>
</tr>
</tbody>
</table>
[0061] The elastic coatings listed in Table 1 above are only intended to be representative and are not in any way limiting. The elastomeric materials that can be used include one or more of large number of latex polymers, epoxies, acrylates and polyurethane polymers that have the desired elastic elongation properties and which will form a strong resilient coating on the edges which will resist chipping or breaking when subjected to impact during shipment and installation.

Example 2
[0062] Several samples of commercially available DUROCK® brand cement board, available from USG Corporation of Chicago, IL 60661, were prepared in the following manner: Wrapped edge sections measuring 6 in. x 4 in. were cut from a single gypsum board. Edges and 2 in. wide sections of the front and back of the panel of these boards were then coated with two coats of the coatings using a foam brush with the elastomeric coatings listed in Table 1 above.

[0063] After coating and drying, the coated board samples 70 were drilled ½ inch from the wrapped edge of each panel. These sections were then tested according to ASTM C473 effective 2007 Standard Test Methods for Physical Testing of Gypsum Panel Products for nail performance. Control samples were tested without coatings. The results are reported in Table 2 below.
### Table 2 – Impact Nailing Test

<table>
<thead>
<tr>
<th>Brand</th>
<th>Average Load (lbs.)</th>
<th>COV Standard Deviation/Avg. (%)</th>
<th>Normalized Load (% of Control Load)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DUROCK® Cement Board Nail IMPACT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Average- No Coating</td>
<td>Not Applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AVG.</td>
<td>86.8</td>
<td>4.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Acrylic Latex Flat Wall Paint</td>
<td>ACE Brand Flat Wall Paint</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avg.</td>
<td>155.5</td>
<td>35.4</td>
<td>179.2</td>
</tr>
<tr>
<td>Latex Semi Gloss Paint Enamel</td>
<td>ACE Brand Semi Gloss Paint – ACRYLIC LATEX ENAMEL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avg.</td>
<td>118.8</td>
<td>52.6</td>
<td>136.8</td>
</tr>
<tr>
<td>Roof Coating</td>
<td>SNOW ROOF SYSTEMS Premium Roof Coating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avg.</td>
<td>157.7</td>
<td>15.3</td>
<td>181.6</td>
</tr>
<tr>
<td>Plastic Dip Spray Coating</td>
<td>PREFORMIX Brand Plastic Dip Spray Coating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avg.</td>
<td>161.9</td>
<td>15.3</td>
<td>181.6</td>
</tr>
</tbody>
</table>

[0064] The control specimens had an average load strength value of 85 LBS, compared to coated specimens having load values of 120 to 160 lbs. Three of the coatings provided an 80% improvement in nail pull results. The
coefficient of variation (COV) for the two materials with higher elongation with higher elongation was substantially lower than the acrylic latex and acrylic latex enamel paints. This indicates that a more consistent result may be obtained through use of coatings having higher elongation.

[0065] After testing, all of the specimens were visually inspected. All of the test specimens exhibited cracking around the nail hole that penetrated the coating.

[0066] The observed results indicated that strength was improved; containment of edge material from overdriven fasteners is not achieved unless a suitable combination of coating thickness and elongation is obtained with a particular elastomeric coating.

EXAMPLE 3

[0067] Elastomeric Coatings of Table 1 are to be used in repeating the test of nail impact of Example 2 with a control and two coats of each of the coatings for samples of (1) DUROCK® brand cement board; (2) FIBEROCK® brand gypsum fiberboard and (3) HARDIE BACKER™ brand ½ inch cement board, available from JAMES HARDIE Building Products, Mission Viejo, CA. Similar improvement in nail impact strength is expected with the three samples of cement and gypsum board.

[0068] Those skilled in the art of cementitious boards, including cement panels, gypsum wallboard, and gypsum fiberboard will recognize that many substitutions and modifications can be made in the foregoing embodiments without departing from the spirit and scope of the present invention.
We claim:

1. A reinforced cementitious board, comprising:
   a core layer of cementitious material having opposed planar surfaces and opposed edges;
   at least one outer layer of fiber reinforcement on the opposed planar surfaces of the core layer and at least one pair of the opposed edges of the core, and
   an elastic polymer coating on the fiber reinforcement on the opposed edges of the core which is compatible with bonding of cementitious materials to improve edge strength of the board.

2. The method of claim 1, wherein the elastic polymer coating also reinforces the edges to protect the opposed edges of the core from impact damage.

3. The cementitious board of claim 1, wherein there is an additional layer of scrim overlaying at least one outer layer of fiber reinforcement on the opposed planar surfaces of the core layer and at least one pair of the opposed edges of the core.

4. The cementitious board of claim 1, wherein the edges of the coated board are rounded.

5. The cementitious board of claim 1, wherein the coating is applied to the portion of the each edge of the board that is approximately 0.635 to 5.08 cm. (0.25 to 2.0 in) from each edge the cement core covered with the fiber reinforcement.

6. The cementitious board of claim 5, wherein the elastic material is sprayed on the edges of the cement board.

7. The cementitious board of claim 5, wherein the coating is painted over the edges of the board.
8. The board of claim 1, wherein the coating is selected from materials having an elongation of from about 100% to about 800%, as measured by the ASTM D522-93(a) test method.

9. The board of claim 8, wherein the coating is selected from materials having an elongation of from about 400% to about 600%, as measured by the ASTM D522-93(a) test method.

10. The board of claim 1, wherein the coating is selected from the group consisting of latex polymer based paints, liquid rubber waterproofing compositions and roof waterproofing coatings.

11. The board of claim 10, wherein the coating is latex based paint.

12. A cementitious board, comprising:
   a core layer of cementitious material having opposed planar surfaces and opposed edges; and
   an elastic polymer coating which is compatible with cementitious materials, on the opposed edges of the core for reinforcing the edges to protect the opposed edges of the core from impact damage.

13. A cementitious board, comprising:
   a core layer of cementitious material having opposed planar surfaces and opposed edges;
   at least one outer layer of scrim on the opposed planar surfaces of the core layer and at least one pair of the opposed edges of the core, and
   an elastic polymer coating which is compatible with cementitious materials on the opposed edges of the core for reinforcing the edges to protect the opposed edges of the core from impact damage.

14. A method of reinforcing a cementitious board comprising a core layer of cementitious material, the core layer having opposed planar surfaces and opposed edges, and at least one outer layer of fiber reinforcement on the
opposed planar surfaces of the core layer and at least one pair of the opposed edges of the core, comprising:

applying a coating of an elastomeric polymer which is compatible with cementitious materials on the opposed edges of the board.

15. The method of claim 14, wherein the elastomeric coating is applied to the edges to produce rounded edges.

16. The method of claim 15, wherein the elastomeric coating is selected from elastomers having an elongation of from about 100% to about 800% when measured by the ASTM D522-93(a) test method.

17. The method of claim 16, wherein the elastomeric coating is selected from elastomers having an elongation of from about 400% to about 600% when measured by the ASTM D522-93(a) test method.

18. The method of claim 14, wherein the coating is applied to the portion of the each edge of the board that is approximately 0.635 to 5.08 cm. (0.25 to 2.0 in.) from the edge where the cement core and outer layers are joined.

19. The method of claim 18, wherein the elastic material is sprayed on the edges of the board.

20. The method of claim 18, wherein the coating is painted over the edges of the cement board.

21. The method of claim 16, wherein the coating is selected from the group consisting of latex polymers based flat and semi-gloss paints, snow systems premium roof coatings and Pfermix brand plasti-dip spray coating.

22. The method of claim 16, wherein the coating is a liquid rubber waterproofing composition having an elongation of 400%.

23. The method of claim 21, wherein the coating is a latex paint.
24. A method of reinforcing a cementitious board comprising a core layer of cementitious material having opposed planar surfaces and opposed edges; comprising:

applying a coating of an elastomeric polymer which is compatible with cementitious materials on the opposed edges of the board.

25. The method of claim 24 wherein there is at least one outer layer of paper on the opposed planar surfaces of the core layer and at least one pair of the opposed edges of the core layer.
FIG. 6  (Prior Art) Conventional DUROCK® Brand Cement Board

FIG. 7  Modified Cement Board
FIG. 8 (Prior Art) SPALLING IN CONVENTIONAL CEMENT BOARD
FIG. 9 Cement Board with Protective Elastic Coating of the Invention
On Panel Edges