

FIBER-REINFORCED CEMENT SIDING MATERIALS SHOULD THEY BE USED ON HISTORIC BUILDINGS?

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132 Charles Street in New York City is a rare example of a surviving wooden building.
Photo: courtesy of the author

Although New York City outlawed wooden buildings in 1875, some still survive, like the house in Greenwich Village at 132 Charles Street, built in 1819 (shown left). In the 1920s, the original wooden clapboards had been covered by a two-inch thick Portland cement stucco application in an attempt to make the building comply with fire-rating standards. By the time the building underwent a thorough rehabilitation in 2003-04, the architects for the project, JHPA, determined that water infiltration between the original clapboard and the later stucco covering had so rotted the wood that it was unsalvageable. New York City Department of Buildings required a fire rating that prevented use of new clapboard in this dense urban location. So JHPA chose to use a fiber-reinforced cement siding material.

Says Michael Devonshire, a JHPA partner, "Our office was a bit hesitant, but mock-ups proved to be quite reasonable. Until you tap it, you cannot tell that it is not wood. It certainly worked in that application, and has an ideal fire rating."

At the time of the application of the new siding, the house and its block were not regulated by New York City Landmarks Law, although they were included in the 2006 expansion of the Greenwich Village Historic District. The owners at the time of the 2003 renovation appreciated the historic character of the house, probably built by a carpenter named Matthew Armstrong. On their behalf, JHPA sought an opinion from the New York City Landmarks Commission (LPC) on the use of the fiber-reinforced cement clapboard on the building, as it was in a proposed historic district. The LPC endorsed the idea and approved of the final results, designating 132 Charles a contributing building within the expanded historic district.

SOME CAUTIONS WHEN USING FIBER-CEMENT SIDING...

Unquestionably cementitious plank siding (fiber-cement siding) is growing in popularity, especially when compared to the inferior properties of new-growth wood in use today. As with many new substitute products, though, fiber cement may not always be an appropriate substitute for traditional wood clapboards and wood shakes. A few concerns to keep in mind when considering it on a historic building:

Thinness of the material: Most cementitious siding is 7/16" in thickness, which is noticeably thinner than most tradi-

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In this application, and in many others on historic buildings around the country, fiber-reinforced cement siding is applied on a flat, solid surface. It may be attached to the diagonal sheathing often found on 19th century buildings, or on new plywood underlayment. The result is a new, durable exterior skin. Unlike the vinyl and aluminum siding used in the late 20th century to refurbish the look of wooden buildings, the reinforced cement clapboard does not cover the original siding. Thus it does not set up the possibility for increased deterioration of the building's original siding and framing through hidden leaks or unseen insect infestation. It allows original, wooden detail-work around windows, doors and cornices to project from the elevation, as they were intended to do. Too often in the application of aluminum and vinyl siding, the wooden detail is shaved off in the siding application, or, if it remains intact, lacks the depth that it once had.

There have also been heroic restorations across the country that removed aluminum or vinyl siding from old wooden houses. With some repairs, the original wooden siding can often be made serviceable again. When fiber-reinforced cement siding is used, that is no longer an option, because the original siding material has been removed. However damaged, it contained information about a particular building, and about the materials and technologies of earlier construction campaigns. What kind of wood was used? How was it sawn or otherwise shaped for use as siding? What traces of original paint remained to tell of the finishes history of the building?

If you follow the *Secretary of the Interior's Standards* (to repair, not replace; or if replacement is necessary, continue to use the same materials), then fiber-reinforced cement siding is definitely not an appropriate choice for historic buildings. But because of its fire-resistant qualities however, it is a helpful choice for keeping the form and appearance of a historic wooden building in

an urban setting where modern building codes demand a quantifiable fire rating; and that fire rating is a valuable asset. Keeping buildings standing is, after all, the goal of historic preservation.

Fiber-reinforced cement has also been recommended for repair or replacement of original siding in places where termites have become a major threat to all wooden buildings. Places like Charleston and New Orleans, the earliest cities in the country to provide legal protection of their historic buildings as an important part of their municipal land use regulations, have allowed properties in their historic districts to use the fiber-reinforced cement siding for insect protection. In the hot and humid climates of the American South, termites can quickly destroy wooden buildings, and the insects care little about whether what they're eating is an architectural landmark in a historic district or a modern tract house. Repairs to siding, framing, and sills of historic buildings can be expensive—and why invest in the restoration if the replacement wood is also a potential termite attractor? Using fiber-reinforced cement siding, at least on the lower parts of building, makes a lot of sense, especially when the unseen parts of the building, like the sills and studs are also replaced with non-wood materials. The loss of architectural integrity through the loss of original material is balanced with the goal of preserving the appearance of the structure, and indeed, the structure itself.

Like wooden siding, fiber-reinforced cement can be finished with color. Unlike wood, which must be painted for a long performance life, fiber-reinforced cement siding may be ordered from the manufacturer with an integral color that never requires painting or upkeep, or it may be painted (and then repainted on a periodic basis) with colors of your choice. This feature is particularly important in historic applications, where early colors and finishes may be startlingly different from today's taste, and the presentation of those vibrant or unusual colors is an important part of the presentation of the building. Although aluminum siding and vinyl siding also offered the promise of being maintenance free, time has shown that aluminum siding's color will fade and turn chalky, and eventually disappear. Vinyl siding will also discolor over time. It may be that not enough time has elapsed for us to clearly see what happens to the integral finish of fiber-reinforced cement, but since it is also designed to be painted, its finish can be refreshed; just as wooden siding has been for centuries.

So, fiber-reinforced cement siding is fire-resistant, rot-resistant, insect-resistant, and can be integrally colored or painted with a regular exterior paint. What, for a preservationist, is there not to love? Well, history may have some lessons.

In the early 20th century, there was a great deal of publicity and interest in a new material: asbestos-reinforced cement. By adding asbestos fibers into cement, a light-weight but durable building material was created. It could be made into shingles, siding, and roofing, and it was fire-resistant, rot-resistant, insect-resistant and it eventually was produced in a variety of colors. However, over the course of the century, people became aware of the devastating illness asbestosis, a fatal lung disease which develops from contact with friable asbestos particles. As the problems with asbestos-laced products became evident, other composite materials were developed to fill the void.

The "fiber" part of fiber-reinforced cement is silicon. One of the most abundant materials on earth, silicon fibers lend strength while reducing the weight of the cement. Imagine pouring cement into a mold to form a twelve-foot long, inch and a half thick "board." You don't have to have much experience with cement as a building material to know that it would be very heavy, very brittle, and just about impossible to attach horizontally on the side of a building. Create a mix with silicon and

tional cedar or redwood siding. Some premium product lines, however, offer fiber-cement siding at 1.5 inches. Fiber-cement shakes are also thinner in section than their traditional wooden counterparts and—to a trained eye—they appear unacceptably flat on a historic building. The flatness of the siding is also more pronounced if the planks are not beveled (in section) to match traditional wood clapboards. Some producers offer fiber-cement siding with a beveled detail, but it costs more and may not be readily available.



*New fiber-cement siding on 1857 Merced Co. (California) courthouse.
Photo courtesy of Mark Odell.*

Problems with installation: Some fiber-cement planks come in lengths as long as 16 feet. The material is also much heavier than wood. When installed over long spans, it usually has a slightly uneven surface, and

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this "ripple effect" creates jagged shadow lines (unlike wood siding). An option is to install the material in short lengths. Some manufacturers also advise against caulking the butt joints in cementitious planks to allow adequate permeability of moisture from inside a building. To those accustomed to wood clapboards on a historic house, these "gaps" in the butt joints are obvious change.

Corners: Fiber-cement siding is primarily designed for buildings with cornerboards. On houses with mitered and/or flared corners (e.g., Craftsman bungalows in the West), it poses problems. The planks can be mitered, but the material is more difficult to cut than wood (and it produces harmful silica dust when it is cut). To overcome this problem, the most common solution is to have exposed butt ends, which on a historic house is an inappropriate substitute. Some new product lines have interlocking corners. This option may become more widely available in the future.

Textured surface: Most siding is offered with a smooth surface or with an embossed grain simulating cedar or redwood. Upon close inspection, this graining tends to look artificial, and the smooth surface may be a better option.

you allow cement to be transformed into "boards" and other relatively thin, light-weight products that can imitate wood.

"Grinder's disease" was a known affliction of potters and ceramic makers in the 19th century. It is a lung disease caused by inhalation of the fine particulate matter generated by ceramic production; today it is known as silicosis. The particular material that irritates the lungs, and which eventually reduces breathing function, is finely ground silicon. Silicon lies embedded within cement when it is present in the composites that form the boards and trimwork of fiber-reinforced cement products, and thus the material is harmless. During installation however, cutting creates tremendous amounts of silicon dust on the worksite. Contractors, and especially do-it-yourselfers, are at risk for developing silicosis. The manufacturers of fiber-reinforced cement siding are very clear in their product literature that installation must be done following detailed instructions which include the use of breathing masks and wetting of the product to minimize dust. But because of the visual similarity of the product and its application to familiar, and less dangerous wooden siding and trim, it is hard to get all contractors to take a genuine health concern associated with its installation seriously.

Asbestos-reinforced materials are also inert when they are present as a siding material. Thousands of houses were built with asbestos shingle siding as an original finish in the mid-20th century, and many older houses were also re-sided by the application of asbestos shingles. They present no problems until the materials are broken, and when they need to be removed. The concern for asbestos and a mandate for its removal from locations where anyone may come in contact with it has led to the virtual poisoning of real estate values for homes where asbestos siding is present. Will fiber-reinforced cement siding come to be similarly regarded in the future?

The preservation of the Modern Movement confronts as one of its major issues the use of manufactured materials, which are not reproducible outside factory conditions. When the manufacturer stops making an item, or redesigns it, there is no replacement, and usually no possibility for repair. Fiber-reinforced cement siding may have a similar fate.

Traditional building materials work because we have a body of knowledge about how they perform in a variety of circumstances over a long period of time. As with any new, manufactured material, fiber-reinforced cement siding offers many promises, but any use should be considered experimental. The material holds great promise for particular applications where the appearance of wooden siding is desired but qualities of fire resistance or insect resistance take precedence; but in properties with the legal mandate to be preserved, the preservation of as much of the original material and traditional building technology should also be highly valued.