## An Examination of New Materials - Part One Cement Fiber Composites

Many community associations are facing the replacement of siding and trim in the early years of the new millennium. Fortunately for these associations, some impressive new materials have come onto the market in the last few years. Unfortunately, many questions exist around the long-term performance of these materials. Which applications are more cost effective? How will they perform in my geographical area? Given the past debacle over Fire-Retardant Treated Plywood (FRTP) and Exterior Insulation Finish Systems (EIFS), are there unintended consequences with these new materials?

This series of articles hopes to highlight a few of these materials and explore these important issues. Due to limitations on the length, these articles cannot possibly explore all exterior applications and materials. These articles will also not address the ecological impact of substituting petrochemical-based composites or fiber cement composites for wood, the traditional renewable resource.

You Can't Fool Mother Nature! Anyone who has been involved in the light-construction industry can tell you that the exterior wood products used today are not the same quality as those used 30 or 40 years ago. The development of high yield timber species has had an adverse effect on the wood quality. Fast growth "engineered" timber, which includes a number of widely used foreign and domestic species, generally possess larger and less dense wood grain. Because this softer wood fiber absorbs more moisture, it is less dimensionally stable, swelling and shrinking at a greater rate than its more dense predecessors. As a result, it is harder to maintain tight joints and adequate paint adhesion. Moisture entering the cracked paint surface and popped caulk joints adds to the problem. Wood destroying insects and fungus attack soft wood at a much more rapid rate than denser, harder wood. The life expectancy of the fast growth wood products does not come close to matching that of the wood that it is replacing. Life Cycle costs increase due to more frequent maintenance and replacement.

**Better Than Wood?** A large number of the new exterior building materials attempt to offer substitutions for the use of wood products. The market approach has been to offer new materials that offer the same architectural aesthetic and installation methods as wood. While many improvements were made to existing products, such as the vinyl sidings and EIFS materials, in the last three decades of the 20<sup>th</sup> century, let's concentrate on the new composite siding product that is unquestionably gaining increased market acceptance.

**Cement Fiber Siding** Referring to cement fiber siding as a "new" technology is a bit of a misnomer. This technology has been used in Europe since the early 20<sup>th</sup> Century. In the United States, cement/mineral fiber shingles, which used asbestos fibers in combination with Portland cement and sand, was common. The fact that many old farmhouses and other older homes are still clad in these shingles today is a testimony to its durability.

The current cement fiber technology uses wood fiber, giving the product strength with an increased workability, while the cement, sand and clay components provide durability and uniformity. The manufacturing process accentuates the advantages of each ingredient resulting in a durable, workable material that resembles wood in many aspects. But this material does not warp, split, or rot, and is impervious to wood destroying insects. The resulting products are aesthetically pleasing in that they offer the same thickness, architectural profile and surface texture as the most widely used types of lapped wood sidings. Even "cedar shingle" type siding products are now produced using this technology.

While it is true that these products are more durable, more uniform and less porous than real wood, that doesn't mean that they are entirely maintenance free. These materials <u>do</u> have to be painted and caulked. A review of the manufacturers' specifications for painting emphasizes the importance of priming prior to installation, and factory priming is recommended. Acrylic latex paint is specified for all finish coat applications. Experience in the field seems to confirm the manufacturers' claims that painting does not have to be done as often. It is too soon, however, to verify whether the 10 to 15 year paint cycles which have been predicted will hold true. What can be said with certainty is that the material is more dimensional stabile and has lower moisture absorption than wood. As a reust, paint adheres better and does not have the

tendency to crack, flake or peel as it does with many wood siding materials. If best case predictions come true, the need for periodic painting will be predicated on the natural weathering of the paint itself, or the owner's desire to change color.

Likewise, the need for re-caulking of joints should be based on the life cycle considerations of the caulk. Traditionally, the expansion and contraction of the wood siding or trim materials has resulted in cracking as older caulk becomes more brittle. Since the cement fiber siding exhibits little or no thermal or moisture expansion, caulk joints should be more stable, eliminating one of the common failure mechanisms. However, until further empirical data is available, it is best to plan on caulking all joints every three years.

So what are the benefits of using cement fiber materials? The initial cost of this material installed is several points higher than the cost of standard wood siding. However, given the longer "expected" life, and lower maintenance costs, the evidence shows a lower life-cycle cost. There is one additional advantage to this material that neither wood or vinyl can provide. The material possesses a Class A, non-combustible fire rating. And since the last application in which we participated was for a condominium building that burned to the ground from a leaf fire that started on the outside, this factor should not be discounted.

So one question remains: Are there unanticipated consequences to these materials? Most industry experts agree that there are probably no surprises lurking in the future. The components of this material are not new. In fact, this is simply a new combination of age-old materials. If the legacy of durability of the farmhouse mineral fiber cement shingles is passed on to this generation of materials, this may indeed be a ideal material for many 21<sup>st</sup> Century siding applications. For those interested in finding more information, these manufacturers have very extensive websites. Certainteed Corporation and James Hardie Building Products are just two of several.

The experience of our firm in condominium-related cement fiber siding applications has been very positive. The manufacturers are offering builders plenty of technical support. They want to ensure that their products don't suffer a bad reputation resulting from improper installation. As more builders and siding contractors are becoming familiar with these materials, we should continue to see their increased use in the community association environment.

Note: Future articles will be available to cover PVC Wood composite trim, new vinyl siding developments, the status of the EIFS industry, and new metal and clay roofing products.