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Substiwood™ - Concrete Lumber

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SUBSTIWOOD™ - CONCRETE LUMBER

THE NEED

In the United States, wood lumber products have always formed the primary (and secondary) elements of many types of construction, especially in the single- and multi-family housing sector. A huge segment of the U.S. economy (on the order of 7 to 8 billion U.S. dollars per year in single-family housing alone) revolves around the common wood framing systems for walls (2x4's or 2x6's) and floors (2x10's, etc.). However, with the growth of the economy, the dwindling forest resources, and the emerging significance of global environmental issues such as the greenhouse effect, a need to re-assess the widespread use of wood lumber products has emerged.

THE TECHNOLOGY

A new cementitious material, 'concrete lumber' products (Substiwood™) developed by Substiwood Inc. is structurally strong, durable, nailable with conventional screws and nails, and sawable using hand or electric saws. Unlike other construction alternatives to wood framing, the Substiwood™ products essentially maintain the existing wood frame construction methods, processes, equipment, and skilled labor. They also minimize changes to the existing plumbing, electrical, and insulation procedures, materials and equipment used in wood frame construction. Substiwood products include two basic grades of "structural" and "non-structural", and a number of sub-categories within each grade. As a minimum, the allowable stresses for the structural grade products meet or exceed the corresponding allowable stresses for the STUD grade wood lumber commonly used in construction. Substiwood™ products allow the existing methods and tools of wood frame construction (including plumbing, electrical work, etc.) to remain essentially unchanged while replacing wood lumber with an environment-friendly cementitious material based product.

FIGURE 1 FLEXURAL LOAD TEST IN 16 INCH SPAN LENGTH

THE BENEFITS

- Can be made in a great variety of colors, sizes and shapes including all dimensional lumber sizes.
- Not affected by common wood defects such as knots, bowing, etc.
- Not susceptible to termites or rotting.
- Excellent strength (flexural, compressive and shear) properties to serve as structural members and can be considered as lightweight concrete.
- Are sawable using hand or electric saws and also can be drilled.
- Could make available the highly-efficient wood-frame housing in areas of the world not possessing forest resources (such as desert areas).
- Environment friendly.
- Offer new possibilities regarding pre-fabricated panels for assembly at the building site.
- Can be utilized in a variety of applications including framing, fencing, decking, landscaping timbers, playground structures, railroad ties, etc.

Based on features above, FRP bars appear to be promising alternative to steel reinforcement in concrete structures such as marine structures, parking structures, bridge decks, highway under extreme environments, and structures highly susceptible to corrosion and magnetic fields.

STATUS

Substiwood, Inc. was formed in 1999 to produce, market and license a series of patent-pending cementitious material based products that replace wood lumber in construction and other applications. The company plans to begin commercial production of Substiwood for non-structural applications by approximately the end of 2000.

BARRIERS

Due to extensive and lengthy processes of independent testing and code approvals for structural (framing) applications of these products, the initial emphasis of the company is being focused on production and marketing for non-structural applications such as landscaping timbers, fencing, etc. However, work on the process of acquiring the necessary code approvals for structural applications will continue.

POINTS OF CONTACT

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REFERENCES

1. Substiwood Inc. <http://www.substiwood.com>.

REVIEWERS

Peer reviewed as an emerging construction technology

DISCLAIMER

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PUBLISHER

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