Reinforced Wood Wool Cement Board

The product we introduce to the challenge is wood frame-embedded Wood Wool Cement Board. The product is a Swedish invention, where it is used mainly as roofing board with a span of 240 cm/8’.

Wood Wool Cement (WWC) as a material has a longstanding reputation for fire resistant acoustic ceilings in Europe, all non-loadbearing. By integrating wooden poles, the Swedish producer of these boards added the loadbearing capacity that opened a whole new world of applications with substantial potential for affordable housing in all climates and geological zones.

As the main ingredients of the product are PEFC/FSC grown wood and Portland cement, it can be produced wherever these ingredients are available. The machine producer is involved in R&D to reduce/replace the cement with more environmentally friendly alternatives and to replace part of the wood with agro waste for countries with limited wood resources. Local production also means local employment for logistics, production, and construction.

The product can be reused endlessly (100%), and after a lifecycle of hundreds of years it can be sent back to the cement producer where the wood burns and saves fossil fuel while the cement breaks down into components that react with water again, reducing the need for quarried material. During its lifetime both the wood and the cement are CO₂ containers. The curing of cement converts up to 50% CO₂ back into the product. The product is waterproof, termite- and vermin-proof, does not rot or mold, and is free of harmful emissions. It can be nailed, drilled, and sawn like wood. The production process requires substantially less energy than needed for other materials and does not result in any water pollution.

The product can be applied in a wide range of building concepts and can be handled by unskilled labor under direction of a trained builder. It can be applied stand-alone or in combination with other building concepts to adapt to local building codes and requirements.

As building with the product is less labor-intensive than alternatives, it is estimated that building with the material will be substantially cheaper than conventional construction with a better quality home as result. It is estimated that a complete home of 50 m²/500 ft² can be produced for less than US $5,000 (excluding land). When equipped with solar panels and sanitation equipment it can be almost self-sustaining in moderate climate zones. In very hot and very cold climate zones, thicker layers of the WWC material can provide additional insulation, reducing the need for heating or cooling appliances.

The availability of the WWC product for a demonstration project and future large-scale production outside Sweden is not a problem, as the technology to produce the boards is available from the machine producer in The Netherlands.