

GREEN TECH THE SERIES COLUMN FOR JUNE 15, 2106

HEADLINE: HEMP-YET ANOTHER ANCIENT MATERIAL STEPS UP!

For centuries, hemp has been grown and used for various purposes, rope and clothing being the most recognizable. It is one of the earliest domesticated plants known. Weaving of hemp has been recognized as far back as 8000 BC. Slightly more recently, the first American dollar was made from hemp. Even Henry Ford got in the act, using it in some body parts of the early Model "T" cars.

In North America, and specifically with our southern neighbor, the close relationship to cannabis, better known as marijuana, caused hemp to be included in the US Marijuana Tax Act of 1937, making cultivation nearly impossible for American farmers. Another law, in the 60's, lumped hemp and marijuana together, while, in fact, there is only a tiny amount of the THC chemical in industrial hemp vs. in the level in marijuana. Along with the marijuana stigma, petrochemicals and their low cost drove hemp off the fields in North America. More recently, however, four American states have passed laws changing this situation and more are expected.

Banned around the world for years, hemp is now making a comeback. Today, it is used in paper, cloth blends and in some plastics. As well, hemp seeds are considered a healthy addition to our diet. A large percentage of hemp seeds are sold in Europe, where it is widely used as animal and bird seed. France and China are major producers and, here at home, in 1998 commercial agriculture licenses for hemp started becoming available. During the 90's many countries began to see the value of hemp and legalization was forthcoming. Some Colorado farmers have planted hemp for commercial use now that it's legal in that state.

Hemp is making a comeback for a lot of applications. One use that has gained some serious interest, of late, is as a building material, specifically as insulation. France has been the world leader in use of hemp in buildings, especially in restoring older timber frame buildings. Assembly methods have been developed, blending timber frame construction and hemp infill, that allows homes to be built within very short time frames.

So how is hemp used as insulation, you might be wondering? The center of the hemp plant is called the xylem. This pithy fiber is chipped and dried for use in a blend with lime. Lime acts as a binder and this blend becomes lightweight, cement like, material. The bonus is that lime reabsorbs all of the CO2 released during its firing; unlike cement, which has a known issue with CO2 in its

manufacture. One study I read during the research on this material said cement produces over double the level of CO<sub>2</sub> as the entire airline industry.

This hemp building mix, or “Hempcrete” as it seems to have become its recognized name, is structurally sound, breathable, can be shaped and then covered with plaster, not unlike the finishes used for the inside of straw bale homes. Hempcrete lacks the brittleness of concrete and does not need expansion joints. The mix does not slump and cures within a few hours, depending upon the temperature. Hempcrete does not have a load bearing capacity, as does cement. It weighs only 1/7<sup>th</sup> the weight of concrete and, while it will help stabilize a platform frame wall, Hempcrete must be used in conjunction with a frame of another material, timber frame or platform frame for example.

The most obvious question is, “What is the R value of Hempcrete?” This is a complex question, as this material is mixed and then compressed into the forms assembled to hold it in place until it cures. With that, you are now dealing with the human factor for consistency. R value is a static number that does not calculate thermal mass performance. Most Hempcrete walls are 12 inches thick or more, which means it can range from R-20 to R-30, or more, on a wall this thick. Yet another condition, due to its formulation, Hempcrete walls breathe, unlike concrete and a lot of other materials. Today, we strive to seal up a home to contain the conditioned air. While there are not a lot of these homes as yet, in the colder climates of Europe they are finding them comfortable and less costly to heat than conventional homes, as well as very comfortable to live in.

Here at home, one of the pioneers of straw bale homes and their development as a recognized alternative building method, Chris Magwood, has released an excellent book on this material. Called the “Essential Hempcrete Construction” Guide, this 122 page book is a well written step-by-step guide on Hempcrete. Chris was also one of the founders of “Endeavour,” a private learning center located just outside Peterborough, Ontario. This sustainable building center actually has courses on building with Hempcrete. Go to [www.endeavourcentre.org](http://www.endeavourcentre.org) for more information.

Like every new-old technology, it begs the question, “Does the Building Code permit it?” Based upon what I was able to find, under section 9 of the OBC, as an alternative solution, this material is permitted. You may find some resistance with some building inspectors, so best to discuss this up front before you build.

The environmental advantages are obvious. It is a renewable material and Canada is now producing more every year, specifically in Alberta and Manitoba right now. The down side is also obvious. It’s a new idea and costly, along with

being labor intensive. Arriving at a consistency that can be evaluated or, at minimum, a method for mixing, not unlike concrete that establishes some batch control may be needed. I understand that a block like Hempcrete is seriously being looked at for commercial production. Hempcrete deserves a chance. Any renewable energy efficiency product with potential to reduce our use of oil is worth a serious look.

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