



Hemp and Lime Construction: A Guide to Building with Hemp-Lime Composites

NNFCC Project No. 07-001

NNFCC Project Factsheet

This Factsheet gives an overview of one of the projects in NNFCC's work programme, funded by Defra. The full report will be available on the NNFCC's website at <http://www.nnfcc.co.uk>

Objectives

- Provide an up-to-date review of the evidence-base for adopting hemp-based products and hemp-lime technologies into mainstream building practice
- Benchmark the UK's position with respect to the utilisation of crop-based construction materials and techniques against appropriate countries in mainland Europe and elsewhere
- Draw together existing knowledge, expertise and performance data on hemp-lime technology to create a technical manual for use by professionals in the construction industry
- Produce a final report on how hemp-lime construction can help to deliver sustainable housing solutions, especially when integrated with other crop-based building materials

Report Summary

What is zero carbon building?

A zero carbon building is currently defined in terms of its net energy balance, encouraging the use of renewable energy 'micro-generation', for example by adding solar panels and wind turbines. These ideas can be found in the Code for Sustainable Homes (see Further Information) and other sustainable building standards being applied by public sector bodies. There is now growing awareness that the nature of the materials, methods of construction, and health of the occupants are equally as important. UK Government policy has begun to encompass these issues.

What's so great about hemp-lime construction?

Many people in the mainstream construction industry are sceptical of the use of natural and so-called 'ecological' materials as it is perceived their performance will be poor compared to conventional products. However, there is growing evidence that some natural materials and eco-composites can out-perform conventional materials in many respects.

Hemp and lime construction can be built on site quickly and efficiently or prefabricated off-site, allowing conventional builders to incorporate the materials into their normal practices with little adjustment. Having a low impact, carbon negative, sustainable form of construction that can be used in volume house building, or even multi-storey office blocks, large factories and warehouses, is an exciting

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Hemp lime block wall



Hemp lime spray application



Hemp lime in shuttering



Hempcrete



Hemp composite loft board

development that provides a genuine solution to demands for zero carbon construction.

Hemp and lime masonry construction is unique because it provides a method of building which is structurally sound, can provide thermal and acoustic insulation, thermal mass and storage but can also be used as the external skin of a building. It is extremely simple to construct, using just one method to meet very many different requirements for walls, floors and even roofs. Most of the other Modern Methods of Construction for natural materials require complicated assemblies of several materials and products.

How is it better for the environment?

Hemp construction uses renewable crop-based materials which have absorbed carbon dioxide (CO₂), providing an opportunity to capture and store CO₂ in the fabric of buildings. It is claimed that hemp and lime can lock up approximately 110 kg of CO₂ per m³ of wall.

Breathability

Hemp-lime composite materials absorb moisture vapour and allow it to pass through the fabric of the building; This effect is known as 'breathing walls'. Structures built from non-breathable materials can trap moisture, which is very likely to cause mould growth, particularly if there is insufficient ventilation and high levels of condensation. Toxic or Black Mould can adversely affect human health. It is not possible to guarantee that toxic mould will not appear in buildings as this is affected by the behaviour and use of a building, but using breathable material could contribute to reducing the problem. Breathability also helps to protect the fabric of the building, particularly against decay in the timbers.

How do costs compare with conventional materials?

The cost basis of the supply of hemp and lime materials is changing as the industry is developing rapidly. A number of significant projects are now being carried out using hemp and lime construction. Cost analyses of these buildings will be available in the next couple of years. Suppliers claim that hemp and lime buildings are comparable to the costs of conventional construction. It would be wrong to assume that using hemp and lime will increase the costs of buildings.

Future development and information sources

Those projects that have been completed using hemp and lime have had no difficulty in getting structural insurance and building regulations approval. Despite the innovative nature of the material, it has not been seen as contributing any significant risks. Companies in the industry are seeking accreditation for their products and building methods from a range of approval bodies and these are likely to be available in the next couple of years. The Hemp Lime Construction Products Association (see Further Information) states that it intends to introduce a series of guides and standards for the use of materials.



Suffolk Housing Association, Haverhill hempcrete house

The Full Report and Further Information

'A Guide to Building with Hemp-Lime Composites' (Bevan and Woolley, 2008) will be published as a book and will also be available in full on the NNFCC website at www.nnfcc.co.uk. Details of materials and further technical information can be found in our NNFCC website at the above address along with the Spring 2007 issue of the NNFCC Newsletter 'Build a Better Building'.

The Code for Sustainable Homes

<http://www.planningportal.gov.uk/england/professionals/en/1115314116927.html>

Hemp Lime Construction Products Association

<http://www.hemplime.org.uk>